

WARZYN



ENGINEERING INC

Consulting Engineers • Civil • Structural • Geotechnical • Materials Testing • Soil Borings • Surveying

1409 EMIL STREET, P O BOX 9538, MADISON WIS 53715 • TEL (608) 257-4848

July 29, 1980
C 9177

Mason & Hangar-Silas Mason Company, Inc.
P.O. Box 1316
Edison, New Jersey 08817

Attention: M.L. Sproul
EERU Manager

Re: Subsurface Investigation
Outboard Marine Corporation
Waukegan, IL

Gentlemen:

We are pleased to submit three (3) copies of our report and associated Drawing describing the subsurface investigation performed at the Outboard Marine Corporation Facility in Waukegan, Illinois. Thank you for contacting us with regard to this investigation. If you should have any questions or desire further clarification, please feel free to contact us.

Very truly yours,

WARZYN ENGINEERING INC.

Robert J. Karnauskas
Hydrogeologist/Project Manager

RJK/dkp

Encl: as stated

SUBSURFACE INVESTIGATION
NORTH DITCH AREA
OUTBOARD MARINE CORPORATION
WAUKEGAN, ILLINOIS

INTRODUCTION

The results of the subsurface investigation performed at the Outboard Marine Corporation - Johnson Division (OMC) property in Waukegan, Illinois are presented in the following report. The investigated area is located in portions of the southwest 1/4 and the southeast 1/4, Section 15, and the northwest 1/4, Section 22, Township 45 North, Range 23 East, Lake County, Illinois. The site is bounded on the east by Lake Michigan, on the south by Waukegan Harbor, on the west by the Chicago and Northwestern railroad tracks, and on the north by the Northshore Sanitary District property. This investigation was undertaken to provide the Environmental Protection Agency, Region 5 with information concerning possible contamination of soil and groundwater by industrial related wastes (PCB). This study was performed under contract to Mason and Hangar-Silas Mason Company, Inc., Edison, New Jersey.

SCOPE

The subsurface investigation consisted of 39 soil borings ranging in depth from 25' to 35', five soil borings to a depth of 6', the installation of seven groundwater monitoring wells, and 20 six foot long sediment cores from the north ditch. All soil samples collected were handled in accordance with Chain of Custody procedures and delivered to Raltech Scientific Services, Madison, Wisconsin, on a weekly basis.



All wells and soil borings were located to a horizontal accuracy of ± 2 feet. The vertical elevations of the tops of all borings and well casings were determined to an accuracy of ± 0.1 feet. Appendix G contains boring and well location and elevation data. Field permeability tests (baildown tests) were performed on all wells installed.

To minimize the potential for cross contamination of samples, all drilling equipment coming into contact with soils was cleaned with acetone between borings. All sampling devices were cleaned with acetone between samples. The potential for encountering harmful substances in the subsurface soils, necessitated the use of extensive protective clothing for all personnel coming into contact with the drilling equipment. Excess soil cuttings and used clothing were disposed of in DOT approved 55 gallon drums for later disposal. Photos are available which document the procedures.

DRILLING PROCEDURE

Two rotary drill rigs were employed during most drilling operations. Six of the sediment cores from the north ditch were obtained by using a tripod rig mounted on a small barge. Logs for all borings, sediment cores and monitoring wells are presented in Appendix C. Drawing C 9177-1 shows the locations of all drilling sites.

A. Soil Borings

Thirty-nine soil borings to a depth of between 20 and 35 feet, and five borings to a depth of 6 feet were performed. The deepest borings were terminated upon entering an underlying, gray, clayey silt layer. Sand and sand and gravel soils were encountered above the silt. In the deeper borings soil samples were taken at the surface and every 5' thereafter.

The deepest soil sample was taken upon contact with the silt layer. In the six foot borings samples were obtained at the surface, at three feet and at six feet.

A combination of hollow stem flight augers and washboring methods were used for drilling operations. Hollow stem flight augers, in 5 foot sections, were advanced into the ground and the soils materials washed from the hole to the appropriate depth for splitspoon sampling. Potable water used in drilling was obtained from the OMC plant. All recirculated drilling water recovered was collected and processed in a portable water treatment plant, maintained on-site by Mason & Hangar-Silas Mason Co. Inc.. Soils removed from the hole, except for the samples, were disposed of in Department of Transportation (DOT) approved 55 gallon drums. Boreholes were backfilled using clean flint sand, similar in permeability to the native soils.

To minimize potential for contamination of soil samples with foreign material, all drilling tools and equipment entering the borehole or coming into contact with equipment entering the borehole, were cleaned in acetone between borings. To help in the removal of soil particles from the drilling equipment, brushing and/or hosing with water was used as necessary prior to acetone rinsing. Prior to mobilization onto OMC property, the drill rigs and all associated equipment were steam cleaned to remove dirt and grease. Petroleum or hydraulic products were not allowed to come into contact with drilling equipment going into the bore hole. A synthetic, PVC-free grease (Molykote 33) was used as substitute for petroleum greases usually used during drilling processes.

Sampling equipment was cleaned with acetone between each sample, to minimize the potential for intra-sample contamination.

B. Monitoring Wells

Five watertable wells and two piezometers (MW2 and MW3) were installed. Well construction details are presented in Appendix D.

The water table wells were constructed with 2" ID type 304 stainless steel pipe attached to 2" ID 5' stainless steel well screens with stainless steel couplings. The top of the well screen was set at or near the water table at each water table well installation.

The piezometers (MW2 and MW3) were installed for the purpose of determining vertical gradients in the groundwater flow system and for water quality monitoring at depth in the groundwater system. The piezometers were constructed of 2" ID stainless steel pipe attached to 2" ID 2' stainless steel screens at depths of approximately 15 and 25 feet.

Monitoring wells were installed by advancing bore holes to the desired depth, and then installing the instrumentation. Soil samples were collected at the surface and at 5' intervals for all water table wells. The bore holes at the piezometer nest (MW1, MW2 and MW3) were sampled in such a manner that samples were obtained by splitspoon methods at 5' intervals to the depth of the deepest well. All procedures described in the previous section, with regards to minimizing of potential contamination of the bore hole and samples, were followed during drilling for monitoring well installation. Boring logs for monitoring wells MW1 - MW7 are presented in Appendix C.

The stainless steel pipes were cleaned by inserting an acetone soaked cloth through the pipe and by spraying acetone into the inside of the pipe. The outside of the pipes were cleaned by spraying directly with acetone and wiping with an acetone soaked cloth. Special attention was given to the threads of the well pipes to remove any cutting oils. The

couplings received similar attention. Well points were cleaned in a manner similar to the stainless steel pipe. Locking protective casings were installed, and cemented into place, for each monitoring well. These protective casings were cleaned on the inside and the outside with acetone. Molykote 23 grease was used to grease well caps and protective casing caps.

After cleaning all stainless steel components of the monitoring wells, the wells were assembled and placed in the borehole. The well screens were backfilled with flint sand to about 1' above the well screen. Piezometers had 3' bentonite pellet seals placed above the sand pack. Backfill consisted of clean sand and/or borehole cave-in material. No spoil material was returned to any of the boreholes. Two to three foot bentonite seals were placed in the annular space to ground surface at all monitoring wells.

C. Sediment Cores

Twenty continuous sediment cores of approximately 5' to 6' in length were collected from the north ditch. Sediment core locations are shown on Drawing C 9177-1.

Continuous cores were obtained by pressing a length of 2" ID stainless steel pipe to a depth of 6' below the top of the trench sediments (except SC-1 which was obtained by split spoon). The top of the pipe was then sealed and the pipe was pulled from the sediments. To minimize loss of the sediments from the bottom of the pipe, a member of the drill crew using acetone cleaned gloves, placed his hand over the bottom of the pipe before the pipe was pulled completely out of the water. At 14 locations the stainless steel pipe was manipulated using an all terrain drill rig on crane pads laid across the channel. At six locations (SC7, - SC12) the trench was too wide to allow the placing of crane pads across it.



Consequently, a small barge with a tri-pod and a small portable motor with a "cat head" was used to drive and remove the stainless steel sampling pipe.

Samples were collected by tapping the outside of the pipe to shake the sediments loose, allowing the sediments to flow into sample jars. Each sample represents approximately 6" of soils material. The stainless steel sampling pipe was thoroughly cleaned with acetone inside and out between sediment cores.

SAMPLE HANDLING PROCEDURES

Soil samples obtained from borings, monitoring wells and soil cores were contained in 32 oz. glass sample jars supplied by U.S. EPA. Aluminum foil was placed over the jar opening before sealing with a screw cap. Labels were provided indicating boring number, sample number, depth, etc.

The soil samples from drilling locations B10, B23, SC1, SC3, SC5, and SC11 were placed in an insulated container with dry ice immediately after collection, to preserve volatile organics present. The samples were delivered to the lab in a frozen condition.

Between each sample, the split spoon sampler was washed and brushed in water to remove any residual soils material. The split spoon was then immersed in acetone. After removal from the acetone bath the sampler was again sprayed with acetone. All samples were collected by drill rig chiefs and maintained in their possession under Chain of Custody procedures (Appendix F) until they were signed over to the field custodian. The field custodian followed Chain of Custody Procedures for delivering the samples to the laboratory.

FIELD BAILOWN TESTS

Baildown tests were performed on the installed monitoring wells to determine subsoil permeabilities. The baildown tests consisted of pumping down the water level inside each well with a 3-horse power gas driven pump and subsequently measuring the recovery of the water level to the static level over time. Depth to water was measured in the wells during the test with a fiberglass measuring tape with an attached "sounder". The time that lapsed during the test was recorded with the use of a watch. The results of the baildown permeability tests are presented in Appendix E. Additional data and methods of reduction are included in Appendix E.

The outside of the hose used for pumping out the wells, the tape, and "sounder" used for measuring water levels were acetone cleaned before being introduced into the well. All water pumped from the wells was collected for processing at the portable water treatment plant. The hose was removed from the well while still pumping so that water having come into contact with the inside of the hose would not be re-introduced into the well after pumping was terminated.

CLOSING REMARKS

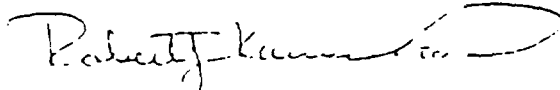
We trust this report and the information contained herein is sufficient for your present needs. If you have any questions or desire further information, please feel free to contact us.

Respectfully submitted,

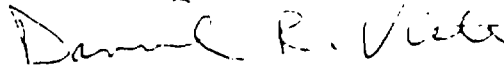
WARZYN ENGINEERING INC.



James A. Hill
Project Geologist



Robert J. Karnauskas, Hydrogeologist
Project Manager



Daniel R. Viste, CPGS
Sr. Adviser/Associate

JAH/RJK/DRV/amh
Encl: See Attached Appendices



APPENDIX A

Subsurface Investigation - General Remarks
Field Methods for Exploration and Sampling Soils

Subsurface Investigation

GENERAL REMARKS

We have endeavored to evaluate subsurface conditions and physical properties of the subsoil as revealed by the borings and laboratory testing. A problem inherent in this evaluation is the variability in engineering properties within soil strata involved, and specifically in any location variation in the soil which is located between borings. Due to natural or man-made causes, subsurface conditions may change with time.

Conclusions drawn and recommendations given in this report are for a specific proposed use of this site. They are our opinions and are based upon conditions that existed at the boring locations and such parameters as proposed site usage, soil loading, elevations, etc..

Since subsurface conditions depend on seasonal moisture variations, frost action, construction methods, and the inherent natural variations, careful observations must be made during construction. These should be brought to our attention as it may be necessary to modify the conclusions and recommendations presented herein.

FIELD METHODS
for
EXPLORATION AND SAMPLING SOILS

A. Boring Procedures Between Samples

The bore hole is extended downward, between samples, by a continuous flight auger, driven and washed-out casing, or rotary boring with drilling mud or water.

B. Standard Penetration Test and Split-Barrel Sampling of Soils
(ASTM* Designation: D 1586)

This method consists of driving a 2" outside diameter split barrel sampler using a 140 pound weight falling freely through a distance of 30 inches. The sampler is first seated 6" into the material to be sampled and then driven 12". The number of blows required to drive the sampler the final 12" is recorded on the log of borings and known as the Standard Penetration Resistance. Recovered samples are first classified as to texture by the driller. Later, in the laboratory the driller's classification is reviewed by a soils engineer who examines each sample.

C. Thin-walled Tube Sampling of Soils (ASTM* Designation: D 1587)

This method consists of forcing a 2" or 3" outside diameter thin wall tube by hydraulic or other means into soils, usually cohesive types. Relatively undisturbed samples are recovered.

D. Soil Investigation and Sampling by Auger Borings (ASTM* Designation: D 1452)

This method consists of augering a hole and removing representative soil samples from the auger flight or bucket at 5'0" intervals or with each change in the substrata. Relatively disturbed samples are obtained and its use is therefore limited to situations where it is satisfactory to determine approximate subsurface profile.

E. Diamond Core Drilling for Site Investigation (ASTM* Designation: D 2113)

This method consists of advancing a hole in hard strata by rotating downward a single tube or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water is used to remove the cuttings. Normally a 2" O.D. by 1 3/8" I.D. coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and laboratory. Cores are stored in partitioned boxes and the length of recovered material is expressed as a percentage of the actual distance penetrated.

*American Society for Testing and Materials, Philadelphia, Pennsylvania

APPENDIX B

Log of Test Boring - General Notes
Unified Soil Classification System Sheet



LOG OF TEST BORING

General Notes

Descriptive Soil Classification

GRAIN SIZE TERMINOLOGY

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel	3/4" to 3"	3/4" to 3"
Coarse	4.75 mm to 3/4"	#10 to #4
Fine	2.00 mm to 4.75 mm	#40 to #10
Sand	0.42 mm to 2.00 mm	#200 to #40
Coarse	0.074 mm to 0.42 mm	Smaller than #200
Medium	0.005 mm to 0.074 mm	Smaller than #200
Fine	Smaller than 0.005 mm	
Silt		
Clay		

Plasticity characteristics differentiate between silt and clay

GENERAL TERMINOLOGY

- Physical Characteristics
 - Color, moisture, grain shape, fineness, etc.
- Major Constituents
 - Clay, silt, sand, gravel
- Structure
 - Laminated, varved, fibrous, stratified, cemented, fissured, etc.
- Geologic Origin
 - Glacial, alluvial, eolian, residual, etc.

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

Proportional Term	Defining Range By Percentage of Weight
Trace	0%-5%
Little	5%-12%
Some	12%-35%
And	35%-50%

ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4-12%
Sedimentary Peat	12-50%
Fibrous and Woody Peat	More than 50%

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

RELATIVE DENSITY

Term	"N" Value
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

CONSISTENCY

Term	q, tons/sq. ft.
Very Soft	0.2 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

PLASTICITY

Term	Plastic Index
None to Slight	0-4
Slight	5-7
Medium	8-22
High to Very High	Over 22

Symbols

DRILLING AND SAMPLING

- CS—Continuous Sampling
- RC—Rock Coring Size 2 1/2" BW, NW, 2" W
- RCD—Rock Quality Designator
- RB—Rock Bit
- FT—Fish Tail
- DC—Drive Casing
- C—Casing Size 2 1/2", NW, 4", HW
- CW—Clear Water
- DMA—Drilling Mud
- MSA—Hollow Stem Auger
- FA—Flight Auger
- HA—Hand Auger
- COA—Clean-Out Auger
- SS—2" Diameter Split-Barrel Sample
- 2ST—2" Diameter Thin Waisted Tube Sample
- 3ST—3" Diameter Thin Waisted Tube Sample
- PT—3" Diameter Piston Tube Sample
- AS—Auger Sample
- WS—Wash Sample
- PTS—Peat Sample
- PS—Pitcher Sample
- NR—No Recovery
- S—Sounding
- PMT—Borehole Pressuremeter Test
- VS—Vane Shear Test
- WPT—Water Pressure Test

LABORATORY TESTS

- q—Penetrometer Reading, tons/sq. ft.
- q_u—Unconfined Strength, tons/sq. ft.
- W—Moisture Content, %
- LL—Liquid Limit, %
- PL—Plastic Limit, %
- SL—Shrinkage Limit, %
- LI—Loss on Ignition, %
- D—Dry Unit Weight, lbs/cu ft
- pH—Measure of Soil Alkalinity or Acidity
- FS—Free Swell, %

WATER LEVEL MEASUREMENT

- Water Level at time shown
- NW—No Water Encountered
- WD—While Drilling
- BCR—Before Casing Removal
- ACR—After Casing Removal
- CW—Caved and Wet
- CM—Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.



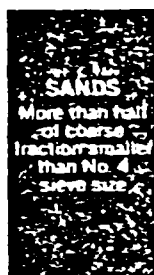
UNIFIED SOIL CLASSIFICATION SYSTEM

COARSE-GRAINED SOILS

(More than half of material is larger than No. 200 sieve size.)



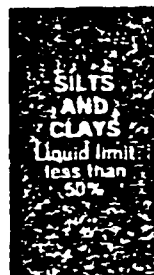
Clean Gravels (little or no fines)	
GW	Well graded gravels, gravel-sand mixtures (little or no fines)
GP	Poorly graded gravels, gravel-sand mixtures (little or no fines)
Gravels with Fines (Appreciable amount of fines)	
GM_u	Silty gravels, gravel-sand-silt mixtures
GC	Clayey gravels, gravel-sand-clay mixtures



Clean Sands (little or no fines)	
SW	Well graded sands, gravelly sands (little or no fines)
SP	Poorly graded sands, gravelly sands (little or no fines)
Sands with Fines (Appreciable amount of fines)	
SM_u	Silty sands, sand-silt mixtures
SC	Clayey sands, sand-clay mixtures

FINE-GRAINED SOILS

(More than half of material is smaller than No. 200 sieve.)



ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL	Organic silts and organic silty clays of low plasticity



MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts



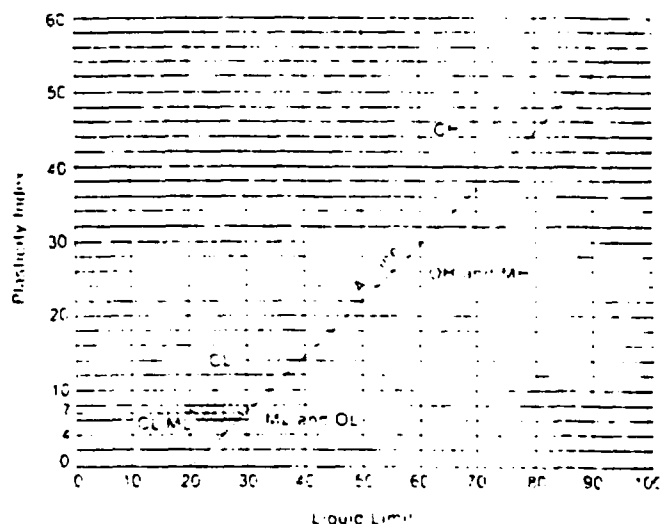
PT	Peat and other highly organic soils
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LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}^2}{D_{10} D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW.	
GM	Atterberg limits below A line or P_L less than 4	Apply A line with P_L between 4 and 7; are borderline cases requiring use of dual symbols
GC	Atterberg limits above A line with P_L greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{D_{30}^2}{D_{10} D_{60}}$ between 1 and 2	
SP	Not meeting all gradation requirements for SW.	
SM	Atterberg limits below A line or P_L less than 4	Limiting plasticity in shaded area; with P_L between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above A line with P_L greater than 7	

Determine percentages of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve) soil-coarse-grained soils are classified as follows:
 Less than 5 percent GW, GP, SW, SP
 More than 12 percent GM, GC, SM, SC
 5 to 12 percent Borderline cases requiring dual symbols

PLASTICITY CHART



For classification of fine-grained soils and fine fraction of coarse-grained soils.

Atterberg Limits plotting in shaded area are borderline classifications requiring use of dual symbols.

Equation of A line: $PI = 0.73(100 - LL)$

APPENDIX C

Logs of Test Boring



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LOG OF TEST BORING

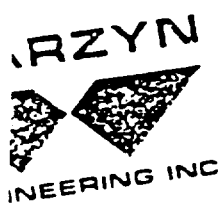
Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. 6-1
 Surface Elevation
 Job No. C-9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		Depth	Qu		W	LL	PL	D	
No	Type	%	%								
1	SS	X	M	9	-	Tan Very Fine to Fine SAND, Trace to Little Silt and Clay					
2	SS	X	W	12	5						
3	SS	X	W	16	10	Gray Very Fine to Fine SAND, Trace Coarse Sand, Trace to Some Silt and Clay					
4	SS	X	W	30	15						
5	SS	X	W	26	20						
6	SS	X	W	12	25	Gray Very Fine to Fine SAND, Trace to Some Silt and Clay					
7	SS	X	W	9							
8	SS	12"	W	14	30	Gray SILT, Trace Clay, Trace Sand	4.0				
						End Boring at 30'					
					35						
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling 13"						Start	5/22/80
Upon Completion of Drilling						Complete	5/22/80
Time After Drilling						Crew Chief	St. Dennis
Depth to Water						Rig	750
Depth to Cave In						Drilling Method	
						Hollow Stem Auger	



LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B-2
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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SAMPLE

Recovery	Moisture	N	Depth
type			
SS	X	M	6

VISUAL CLASSIFICATION and Remarks

SOIL PROPERTIES

Qu	W	LL	PL	D
----	---	----	----	---

Tan Very Fine to Medium SAND

Gray Very Fine to Medium SAND, Trace Organic Material, Trace to Some Silt and Clay

Denser

GRAVEL, Some Fine to Coarse Sand

Gray SILT, Trace Clay, Trace Sand

End Boring at 35'

Note: 32½' Drove a Rock No Recovery

WATER LEVEL OBSERVATIONS

While Drilling 39"
Upon Completion of Drilling
Time After Drilling
Depth to Water
Cave In

GENERAL NOTES

Start 5/23/80 Complete 5/23/80
Crew Chief St. Dennis Rig 750
Drilling Method
Hollow Stem Auger

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Wuakegan, Illinois

Boring No B-3
 Surface Elevation 563.2
 Job No C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538 MADISON, WIS 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _v	W	LL	PL	D
No	Type	✓	✓								
1	SS	X	M	3		Tan Very Fine to Medium SAND					
2	SS	X	W	14	5						
3	SS	X	W	25	10	Gray Very Fine to Fine SAND, Trace Silt and Clay					
4	SS	X	W	20	15						
5	SS	X	W	21	20	Gray Very Fine to Fine SAND, Trace to Little Silt and Clay					
6	SS	X	W	28	25						
7	SS	X	W	63	30	* **					
						End Boring at 30'					
					35	* GRAVEL Some Fine to Coarse Sand					
						** Gray SILT, Trace Clay, Trace Sand					
					40						

WATER LEVEL OBSERVATIONS

While Drilling 26"
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/30/80 Complete 5/30/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method
 Hollow Stem Auger

WARZYIN

ENGINEERING INC
LOG OF TEST BORING

Project: Subsurface Investigation
 Outboard Marine Corporation
 Location: Waukegan, Illinois

Boring No. B-4
 Surface Elevation 582.8
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9532, MADISON, WIS 53715 • TEL (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				Qu	W	LL	PL	D
No.	Type	%	%	N	Depth						
1	SS	X	M	8	-	Brown & Gray Fine to Medium SAND, Trace to Little Silt, Slightly Organic					
2	SS	X	W	22	5						
3	SS	X	W	8	10	Black Fine to Medium SAND, Trace to Little Silt and Clay					
4	SS	X	W	26	15	Gray Very Fine to Medium SAND, Trace to Some Silt, Scattered 2" to 4" Layers Sandy Silt with Shells, Some Organic Material					
5	SS	X	W	24	20						
6	SS	X	W	12	25						
7	SS	X	W	16	30	Gray SILT, Trace Clay, Trace Sand	4.0				
						End Boring at 32'					
					35						
					40						

WATER LEVEL OBSERVATIONS
GENERAL NOTES

While Drilling 19"
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

Start 5/21/80 Complete 5/21/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method
 Hollow Stem Auger



ENGINEERING INC

LOG OF TEST BORING

Project .. Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B-5
Surface Elevation 583.1
Job No. C 9177
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538. MADISON, WIS 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	v	v	N	Depth						
1	SS	4"	M	11		Tan & Gray Very Fine to Fine SAND, Trace Silt, and Clay Soil Gray Only					
2	SS	X	W	17	5						
3	SS	7"	W	28	10	6" Layer Gravel, Coarse Sand					
4	SS	1'	W	13	15						
5	SS	1'4"	W	29	20	Lighter Gray					
6	SS	1'5"	W	31	25						
7	SS	1'2"	W	42	30	*					
8	SS	1'1"	M	100		Gray SILT, Trace Clay, Trace Sand					
						End Boring at 31'6"					
					35	* Gray Very Fine to Coarse SAND, Trace to Little Silt and Clay, Trace Gravel					
					40						

WATER LEVEL OBSERVATIONS

While Drilling					
Upon Completion of Drilling					
Time After Drilling	<u>1/4 hour</u>				
Depth to Water	<u>2' 6"</u>				
Depth to Cave In					

GENERAL NOTES

Start 5/22/80 Complete 5/22/80
Crew Chief JWG Rig 55-1
Drilling Method
Hollow Stem Auger



LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B-6
Surface Elevation 584.9
Job No. C 9177
Sheet 1 of 1

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SAMPLE				VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery	Moisture	N	Depth		Qu	W	LL	PL	D
SS	X	M	3	Tan Very Fine to Medium SAND, Trace Silt and Clay					
SS	X	W	37	Gray Very Fine to Fine SAND, Trace Silt and Clay					
SS	X	W	32	Gray Very Fine to Medium SAND, Trace Silt, Scattered 1/8" to 1/4" Seams Black Fine Sand					
SS	X	W	20	Gray Very Fine to Fine SAND, Trace to Some Silt and Clay, Streaked Black					
SS	X	W	34	Occasional Shells					
SS	X	W	30	Layer Coarse Sand Some Large Gravel 29 1/2' to 30'					
SS	X	W	27	Gray SILT, Trace Clay, Trace Sand	4.5+				
SS	X	W	34	End Boring at 33.5'					

WATER LEVEL OBSERVATIONS

While Drilling 37"
Upon Completion of Drilling
Time After Drilling
Depth to Water
Cave In

GENERAL NOTES

Start 6/2/80 Complete 6/2/80
Crew Chief St. Dennis Rig 750
Drilling Method
Hollow Stem Auger

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No B-7
 Surface Elevation 584.9
 Job No C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		Q _v	W	LL	PL	D
No	Type	↓	↓								
1	SS	1'	M	17	-	Tan Very Fine to Medium SAND, Trace Silt and Clay					
2	SS	1' 4"	W	10	5						
3	SS	10"	W	13	10	Gray Very Fine to Fine SAND, Trace to Little Silt and Clay Occasional Coarse Sand, Gravel					
4	SS	X	W	31	15						
5	SS	1' 3"	W	50	20						
6	SS	X	W	24	25						
7	SS	1'	W	23	30	GRAVEL Some Fine to Coarse Sand					
8	SS	X	W	103	35	Gray SILT, Trace Clay, Trace Sand	4.5+				
						End Boring at 33' 6"	4.5+				
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling ½ hour _____
 Depth to Water 4± _____
 Depth to Cave In _____

GENERAL NOTES

Star 5/22/80 Complete 5/22/80
 Crew Chief JWGRig 55-1
 Drilling Method _____
 Hollow Stem Auger

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B-8
 Surface Elevation 585.3
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q	w	LL	PL	D
No.	Type	v	v	N	Depth						
1	SS	X	M	6		FILL: Tan & Gray Mixed Fine to Medium SAND, Trace Silt,					
2	SS	X	W	18	5	Gray & Black Mixed Fine to Coarse SAND, Trace Silt and Clay, Trace Fine Gravel					
3	SS	X	W	28	10	Dark Gray Very Fine to Medium SAND, Trace to Little Silt and Clay					
4	SS	X	W	27	15						
5	SS	X	W	50	20	Lighter Gray with Scattered 1/2" Seams of Darker. Soil of Same Description as Above					
6	SS	X	W	25	25						
7	SS	X	W	100	30	Siltier					
8	SS	X	M	60	35	Gray SILT, Trace Clay, Trace Sand Many 1/2" Seams & Streaks, Very Dense Silt	4.5+				
					40	End Boring at 33.5'					
WATER LEVEL OBSERVATIONS							GENERAL NOTES				
While Drilling 46"							Start 6/2/80 Complete 6/2/80				
Upon Completion of Drilling							St. Dennis 750				
Time After Drilling							Crew Chief Rig				
Depth to Water							Drilling Method				
Depth to Cave In							Hollow Stem Auger				

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B-9
 Surface Elevation 584.2
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	%	%	N	Depth						
1	SS	NR	M	-	-	FILL- Fine to Medium SAND, Some to Trace Silt and Gravel *					
2	SS	X	W	16	5	Black Very Fine to Medium SAND. Trace Organic, Trace to Some Silt and Clay					
3	SS	8"	W	30	10	Gray Fine to Medium SAND, Trace to Little Silt & Clay, Trace Gravel					
4	SS	7"	W	33	15						
5	SS	6"	W	32	20	Gray Very Fine to Fine SAND, Trace to Little Silt and Clay					
6	SS	12"	W	25	25						
7	SS	12"	W	22	30						
8	SS	X	W	27	35	Gray SILT, Trace Clay, Trace Sand, Trace Fine Gravel, Scattered Layers Dense Silt	2.5				
					35	End Boring at 33.5'	4.5				
					40	* Some Wood & Asphalt, No Recovery-Pushed Piece of Asphalt					
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling 22"						Start 5/22/80, complete 5/22/80					
Upon Completion of Drilling						St. Dennis					
Time After Drilling						Crew Chief Rig 750					
Depth to Water						Drilling Method					
Depth to Cave In						Hollow Stem Auger					



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. 5-10
Surface Elevation 583.8
Job No. C 9177
Sheet 1 of 1

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. 8-11
Surface Elevation 585.4
Job No. C 9177
Sheet 1 of 1

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SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Type	Recovery	Moisture	Depth		q _v	W	LL	PL	D
1	SS	1'4"	M	24	3" Blacktop					
2	SS	1'	W	23	FILL: Tan Very Fine to Coarse SAND and Gravel & Stone Chips, Trace of Silt and Clay					
3	SS	10"	W	27	Tan to Gray Very Fine to Fine SAND, Trace Silt and Clay					
4	SS	10"	W	42						
5	SS	1'	W	38						
6	SS	11"	W	34						
7	SS	1'4"	M	21	Tan to Gray Very Fine to Fine SAND, Trace Silt and Clay					
					GRAVEL Some Fine to Coarse Sand					
					Gray SILT, Trace Clay, Trace Sand	3.0/				
					End Boring at 30'	3.5				
WATER LEVEL OBSERVATIONS						GENERAL NOTES				
While Drilling _____						Start 5/28/80 Complete 5/28/80				
Upon Completion of Drilling _____						Crew Chief JWG Rig 55-1				
Time After Drilling 1/4 hour _____						Drilling Method _____				
Depth to Water 3.0' _____						Hollow Stem Auger _____				
Depth to Cave In _____										



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Boring No. B-12
Surface Elevation 585.2
Job No. C 9177
Sheet 1 of 1

Project Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No B-13
 Surface Elevation 585.2
 Job No C 9177
 Sheet 1 of 1

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SAMPLE				VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery pe	Moisture v	N	Depth		Qu	W	LL	PL	D
S	X	M	18	FILL: Brown to Gray, Very Fine to Coarse SAND, Some Gravel & Stone Chips, Trace to Little Silt and Clay					
S	1'1"	W	24	5 Light Brown Very Fine to Medium SAND, Trace Silt and Clay					
S		W	24	10					
SS	1'2"	W	23	15	Gray Very Fine to Fine SAND, Trace to Little Silt and Clay				
SS	1'1"	W	32	20					
SS	1'4"	W	40	25					
SS	X	M	81	30	GRAVEL Some Fine to Coarse Sand Gray SILT, Trace Clay, Trace Sand End Boring at 30'	4.5/			
					4.5				
				35					
				40					
WATER LEVEL OBSERVATIONS					GENERAL NOTES				
Site Drilling					Start 5/29/80, Complete 5/29/80				
Drilling Completion of Drilling					Crew Chief JWG Rig 55-1				
Time After Drilling 1/2 hour					Drilling Method				
Depth to Water 3'0"					Hollow Stem Auger				
Depth to Cave In									



LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Spring No. 8-14
 Surface Elevation 584.9
 Job No. C 9177
 Sheet: 1 of 1

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SAMPLE				VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery type	Moisture %	N	Depth		q _v	w	LL	PL	D	
SS	1'4"	M	27	3" Blacktop						
				FILL: Brown SAND & GRAVEL, Trace to Little Silt and Clay						
SS	6"	W	13	Gray Very Fine to Fine SAND, Trace Silt and Clay Occasional Gravel, Medium Sand						
X		W	51							
SS	8"	W	42							
5	SS	1'	W 40	2" Layer Coarse Sand						
6	--	7"	W 23							
7	SS	1'	W 15							
8	SS	1'	M 66	Gray SILT, Trace Clay, Trace Sand	4.5/					
				End Boring at 31'6"	4.5					
		</								

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Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B-15
 Surface Elevation 583.8
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538 MADISON, WIS 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				Qu	W	LL	PL	D
No.	Type	r	v	N	Depth						
1	SS	X	M	40		1" Blacktop					
						FILL: Brown SAND and GRAVEL					
						Dark Gray Very Fine to Medium SAND, Trace Silt (Note: Strong Odor of Fuel Oil) and Clay					
2	SS	6"	W	22	5						
3	SS	6"	W	23	10						
						Gray Very Fine to Fine SAND, Trace Silt and Clay					
4	SS	7"	W	15	15						
5	SS	9"	W	13	20	Seam Coarse Sand					
6	SS	9"	W	30	25						
7	SS	1'3"	W	46	30	Gray SILT, Trace Clay, Trace Sand End Boring at 30'	4.5+/- 4.5+				
					35	* GRAVEL Some Fine to Coarse Sand					
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling $\frac{1}{4}$ hour _____
 Depth to Water 3'0" _____
 Depth to Cave In _____

GENERAL NOTES

Start 5/30/80 Complete 5/30/80
 Crew Chief JWGRig 55-1
 Drilling Method _____
 Hollow Stem Auger _____



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B-16
Surface Elevation 583.9
Job No. C 9177
Sheet 1 of 1

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Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B-17
Surface Elevation 584.6
Job No. C 9177
Sheet 1 of 1

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture			q _v	W	LL	PL	D
No	Type	%	%	N						
						3 3/4" Asphalt				
1	SS	12"	M	13		FILL: Tan Fine to Coarse SAND Some Gravel				
2	SS	X	W	19	5	Tan Fine to Coarse SAND, Trace Gravel, Trace Silt and Clay				
3	SS	X	W	29	10	Tan Fine to Medium SAND, Trace Silt & Clay Occasional 1/2" Seams Coarse Sand				
4	SS	X	W	27	15					
5	SS	15"	W	22	20	Gray Very Fine to Fine SAND, Trace to Some Silt and Clay				
6	SS	X	W	25	25					
7	SS	12"	W	68		GRAVEL Some Fine to Coarse Sand				
8	SS	15"	W	61	30	Gray SILT, Some Clay				
						End Boring at 30'				
					35					
					40					

While Drilling 30"

Upon Completion of Drilling _____

Time After Drilling _____

Depth to Water _____

Depth to Cave In _____

Start 6/3/80 Complete 6/3/80
St. Dennis
Crew Chief Rig 750
Drilling Method
Hollow Stem Auger

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. 6-18
 Surface Elevation 584.7
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	12"	M	12	-	FILL: Tan Fine to Medium SAND, Trace Silt and Clay, Some Gravel					
2	SS	8"	W	21	5	Light Brown Very Fine to Fine SAND, Trace Silt and Clay					
						Occasional Coarse Sand					
3	SS	7"	W	27	10						
4	SS	6"	W	28	15						
5	SS	1'2"	W	49	20	Coarse Sand Layer					
6	SS	1'2"	W	30	25						
7	SS	X	M	58	30	Gray SILT, Some Clay	4.5+y				
						End boring at 30'	4.5+				
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling 1/2 hour _____
 Depth to Water 3' _____
 Depth to Cave In _____

GENERAL NOTES

Start 6/2/80 Complete 6/2/80
 Crew Chief JWGRig 55-1
 Drilling Method _____
 Hollow Stem Auger



Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. 8-19
Surface Elevation 584.4
Job No. C 9177
Sheet 1 of 1

Start 6/2/80 Complete 6/2/80
Crew Chief JWG Rig 55-1
Drilling Method Hollow Stem Auger

LOG OF TEST BORING

Boring No. 583.9
Surface Elevation C 9177
Job No. 1 of 1
Sheet

Project Subsurface Investigation
Outboard Marine Corporation
Waukegan, Illinois

Location Waukegan, Illinois
EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

VISUAL CLASSIFICATION and Remarks		SOIL PROPERTIES				
		q _s	W	LL	PL	D
1	Depth 3" Blacktop					
2	FILL: Tan SAND, and GRAVEL Trace to Little Silt and Clay					
3	Tan to Gray Very Fine to Coarse SAND, Trace of Silt and Clay, Little to Trace Gravel					
4						
5						
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99						
100						

Gray Very Fine to Fine SAND, Trace Silt and Clay

Gray SILT, Some Clay, Trace Sand

End Boring at 30'

4.5+1

4.5

WATER LEVEL OBSERVATIONS

Drilling _____

Completion of Drilling _____

1/2 hour _____

After Drilling _____

3'0" _____

With to Water _____

With to Cave In _____

GENERAL NOTES

Start 6/3/80 Complete 6/3/80

Crew Chief JWG Rig _____

Drilling Method _____

How Stem Auger _____

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Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B-21
 Surface Elevation 583.8
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery		Moisture		N	Depth		q _v	W	LL	PL	D	
No.	Type	↓	↓									
1	SS	X	M	19		4" Asphalt						
						FILL: Tan Fine to Coarse SAND & GRAVEL, Trace Silt						
2	SS	X	W	18	5	Gray Fine to Medium SAND, Trace Silt and Clay Occasional Wood Fragments						
3	SS	X	W	28	10							
4	SS	12"	W	37	15							
5	SS	12"	W	28	20	Occasional Black Streaks at 20'						
						Gray Very Fine to Fine SAND, Trace to Some Silt and Clay						
6	SS	X	W	26	25							
						* Gray SILT, Trace Clay, Trace Sand						
7	SS	X	M	29	30	End Boring at 29'						
						* GRAVEL, Some Fine to Coarse Sand						
					35							
					40							

WATER LEVEL OBSERVATIONS

While Drilling 26"
 Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave In _____

GENERAL NOTES

Start 6/3/80 Complete 6/3/80
St. Dennis
 Crew Chief Rig 750
 Drilling Method _____
Hollow Stem Auger

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Waukegan, Illinois

Boring No. 8-22
 Surface Elevation 584.4
 Job No. C 9177
 Sheet 1 of 1

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AMPLE

Moisture
 N Depth
 M 19

4" W 26

SS 1' W 20

SS 1'2" W 45

5 SS 1'2" W 26

6 SS 1'3" W 35

7 SS X W 105

VISUAL CLASSIFICATION and Remarks

3" Blacktop
 FILL: Tan SAND, Some Gravel

Tan to Gray Very Fine to Coarse SAND, Some to Little Gravel

Gray Very Fine to Fine SAND, Some to Trace Silt and Clay

GRAVEL Some Fine to Coarse Sand
 Gray SILT, Trace Clay, Trace Sand

End Boring at 30'

SOIL PROPERTIES

qu W LL PL D

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling 1/2 hour
 Time After Drilling 3'0"
 to Water _____

GENERAL NOTES

Start 6/4/80 Complete 6/4/80
 Crew Chief JWG Rig
 Drilling Method _____
 Hollow Stem Auger _____

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B-23
 Surface Elevation 584.4
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	X	M	17		3" Blacktop					
						FILL: Gravel					
						Gray and Tan Very Fine to Fine SAND, Trace Silt and Clay Occasional Gravel, Coarse Sand					
2	SS	9"	W	20	5						
3	SS	1'	W	45	10						
4	SS	6"	W	27	15						
5	SS	1'	W	39	20						
6	SS	1'1"	W	18	25						
						Gray SILT, Some Clay					
7	SS	1'4"	M	86	30	End Boring at 29'	4.5+/ 4.5+				

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling 1/2 hour _____
 Depth to Water 4' _____
 Depth to Cave In _____

GENERAL NOTES

Start 5/27/80 Complete 5/27/80
 Crew Chief JWG Rig 55-1
 Drilling Method _____
 Hollow Stem Auger _____



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LOG OF TEST BORING

Project Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. 8-24
Surface Elevation 583.9
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _s	W	LL	PL	D
No.	Type	↓	↓								
						3½" Asphalt					
1	SS	X	M	11							
2	SS	X	W	30	5	Tan Fine to Medium SAND, Trace Silt & Clay Occasional Gravel Seams					
3	SS	6"	W	28	10						
4	SS	X	W	25	15	Gray Very Fine to Fine SAND, Trace Silt & Clay, Trace Gravel					
5	SS	X	W	34	20						
6	SS	X	W	26	25						
7	SS	X	M	51	30	GRAVEL with Fine to Coarse Sand Gray SILT, Some to Little Clay, Little to Trace Sand, Trace Gravel					
						End Boring at 30'					
						* FILL: Tan Fine to Coarse SAND & GRAVEL Trace Silt & Clay					
					35						
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling	24"					Start	6/3/80
Upon Completion of Drilling						Complete	6/3/80
Time After Drilling						St. Dennis	750
Depth to Water						Crew Chief	Rig
Depth to Cave In						Drilling Method	
						Hollow Stem Auger	

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B25
 Surface Elevation 583.7
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _v	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
						6" Blacktop						
1	SS	1'	M	14		FILL: Tan SAND & GRAVEL, Little to Trace Silt and Clay						
2	SS	1'	W	13	5		Occasional Gravel					
3	SS	1'	W	33	10		Gray Very Fine to Fine SAND, Trace Silt and Clay					
4	SS	1'	W	62	15							
5	SS	1'	W	10	20							
6	SS	1'	W	63	25	GRAVEL Some Fine to Coarse Sand						
7	SS	3"	M	-		End Boring at 25'						

WATER LEVEL OBSERVATIONS

While Drilling
 Upon Completion of Drilling
 Time After Drilling ½ hour
 Depth to Water 3'
 Depth to Cave In

GENERAL NOTES

Start 6/3/80 Complete 6/3/80
 Crew Chief JWGRig 55-1
 Drilling Method
 Hollow Stem Auger



Project Subsurface Investigation
 Location Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B26
 Surface Elevation 584.4
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Type	Recovery ↓	Moisture ↓	N	Depth		q _s	W	LL	PL	D
						3½" Asphalt					
						*					
1	SS	X	M	15		FILL: Brown & Black Fine to Medium SAND Trace Silt and Clay					
2	SS	X	W	15	5	Gray Fine to Coarse SAND and Fine to Coarse Gravel, Trace Silt and Clay					
3	SS	10"	W	25	10	Gray Fine to Medium SAND, Trace to Some Silt and Clay					
4	SS	12"	W	42	15	Soil Contains Black Material					
5	SS	X	W	19	20	Gray Silt-Many 4" to 6" Layers Clayey SILT Scattered ½" Seams Coarse Sand					
6	SS	X	W	4	25	GRAVEL, Some Fine to Coarse SAND					
7	SS	6"	M	74	30	Gray SILT, Trace Clay, Trace Sand	4.5+				
					35	End Boring at 29'					
					40	* FILL: Tan Fine to Coarse SAND and GRAVEL, Trace to Some Silt & Clay					
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
Hole Drilling 23"						Start 6/4/80 Complete 6/4/80					
Upon Completion of Drilling						St. Dennis Rig 750					
Time After Drilling						Drilling Method					
Depth to Water						Hollow Stem Auger					
Depth to Cave In											



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. 827
Surface Elevation 584.1
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						3½" Asphalt					
1	SS	6"	M	17		FILL: Brown Fine to Medium SAND & GRAVEL Trace Silt and Clay					
2	SS	6"	W	15	5-	Dark Gray					
3	SS	12"	W	19	10-	Gray Very Fine to Fine SAND, Trace to Some Silt and Clay					
4	SS	X	W	26	15-						
5	SS	X	W	29	20-						
6	SS	NR	-	-	25-	Gray SILT, Some to Little Sand & Clay, Little to Trace Gravel					
7	SS	4½"	M	100		End Borino at 26½'					
					30-						
					35-						
					40-						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____ 38"						Start 6/6/80 Complete 6/6/80					
Upon Completion of Drilling _____						St. Dennis Crew Chief _____ Rig 750					
Time After Drilling _____						Drilling Method _____					
Depth to Water _____						Hollow Stem Auger _____					
Depth to Cave In _____											

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B28
 Surface Elevation 585.2.....
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	1'2"	M	25	5	Tan SAND & GRAVEL, Little to Trace Silt and Clay					
2	SS	1'1"	W	3		Dark Gray SAND, Some to Little Organic Silt, Trace Gravel Fibrous Material Noted					
					10	Gray Very Fine to Fine SAND, Trace Silt and Clay					
3	SS	6"	W	25		Lighter					
4	SS	1'2"	W	37	15	4" Layer Coarse Sand					
5	SS	1'2"	W	38	20						
6	SS	X	W	62	25						
7	SS	1'2"	M	117		Gray SILT, Some Clay, Little to Trace Sand and Gravel	4.5/				
					30	End Boring at 29'0"	4.5				
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling
 Upon Completion of Drilling
 Time After Drilling ½ hour
 Depth to Water 3'6"
 Depth to Cave In

GENERAL NOTES

Start 6/4/80 Complete 6/4/80
 Crew Chief JWG Rig 55-1
 Drilling Method
 Hollow Stem Augers

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. 829
 Surface Elevation 584.8
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		H	Depth		q _s	W	LL	PL	D
No.	Type	↓	↓								
1	SS	X	M	11		Tan Fine to Medium SAND, Some to Little Silt, Trace Gravel, Blue Clay & Silt 1½' to 2½'					
2	SS	X	W	10	5	Black Fine to Coarse SAND, Some Fine to Coarse Gravel, Trace to Little Silt & Clay					
3	SS	X	W	9	10						
4	SS	X	W	15	15	Gray Very Fine to Medium SAND Little to Trace Silt and Clay, Trace Fine Gravel					
5	SS	X	W	38	20						
6	SS	X	M	33	25	**	4.5+				
						End Boring at 25'					
					30	* 3" FILL: Black Fine to Coarse SAND, Some to Trace Silt and Gravel					
					35	** Gray SILT, Some Clay, Very Scattered 1/16" Seams of Clay					
					40						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____						Start <u>6/5/80</u> Complete <u>6/5/80</u>					
Upon Completion of Drilling _____						St. Dennis Crew Chief _____ Rig <u>750</u>					
Time After Drilling _____						Drilling Method _____					
Depth to Water _____						Hollow Stem Auger					
Depth to Cave In _____											

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B30
 Surface Elevation 585.1
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	X	M	14	5	Cinders					
2	SS	3"	W	3		Attempted Twice to Obtain Sample 2 Gray Very Fine to Coarse SAND, Trace Silt and Clay					
3	SS	1'	W	39	10	Gray Very Fine to Fine SAND, Trace Silt and Clay. Trace Fine Gravel					
4	SS	9"	W	22	15						
5	SS	1'	W	46	20						
6	SS	X	M	25	25	* End Boring at 25'	4.5+/-				
						* Gray SILT, Some to Little Sand & Clay, Little to Trace Gravel	4.5+				
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling
 Upon Completion of Drilling
 Time After Drilling ½ hour
 Depth to Water 2'6"
 Depth to Cave In

GENERAL NOTES

Start 6/6/80 Complete 6/6/80
 Crew Chief JWG Rig 55-1
 Drilling Method
 Hollow Stem Auger

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. 831
 Surface Elevation 584.1
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				Qu	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	1'	M	33	5	Brown SAND and GRAVEL, Little to Trace Silt and Clay					
2	SS	4"	W	2							
3	SS	1'	W	33	10	Gray Very Fine to Fine SAND, Trace Silt and Clay					
4	SS	1'2"	W	13	15						
5	SS	1'	W	49	20						
6	SS	1'4"	W	41	25	* End Boring at 25'	4.5/ 4.5				
					30	* Gray SILT, Some to Little Clay, Little to Trace Sand, Trace Gravel					
					35						
					40						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					

WATER LEVEL OBSERVATIONS

While Drilling
 Upon Completion of Drilling
 Time After Drilling ¼ hour
 Depth to Water 3.1
 Depth to Cave In

GENERAL NOTES

Start 6/5/80 Complete 6/5/80
 Crew Chief JWG. Rig 55-1
 Drilling Method
 Hollow Stem Auger

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B32
 Surface Elevation 584.6
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery		Moisture		H	Depth		Q _v	W	LL	PL	D	
No.	Type	↓	↓									
1	SS	10"	M	3		FILL: Brown & Black Fine to Medium SAND, Trace Silt and Clay						
2	SS	8"	W	9	5	Black & Gray Fine to Coarse SAND, Fine to Coarse Gravel, Trace Silt and Clay Black Oily Substance Noted in Sample						
3	SS	X	W	14	10	Gray Fine to Coarse SAND, Trace Silt & Clay, Trace Gravel						
4	SS	14"	W	16	15							
5	SS	X	W	41	20							
6A			W			Gray SILT, Some to Little Clay, Little to Trace Sand Trace Gravel						
6B						Note Oil Smell in Bottom 3" of Sample 5						
6C	SS	X	M	92	25	23'6" to 23'7" 4" Piece of Wood	4.5+/-					
						End Boring at 25'	4.5+					
					30							
					35	* GRAVEL, Some Fine to Coarse Sand						
					40							

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling 34"						Start 6/5/80 Complete 6/5/80	
Upon Completion of Drilling						St. Dennis	
Time After Drilling						Crew Chief Rig 750	
Depth to Water						Drilling Method	
Depth to Cave In						Hollow Stem Auger	

Stn 6/4/80 Complete 6/4/80
St Dennis Rig 750
Crew Chief
Drilling Method
Hollow Stem Auger



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. B34
Surface Elevation 584.9
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _v	W	LL	PL	D
No.	Type	↓	↓								
1	SS	X	M	40		FILL: Tan SAND & GRAVEL, Some to Little Silt and Clay					
2	SS	1'	W	5	5	Gray Very Fine to Fine SAND, Trace Silt and Clay, Trace Fine Gravel					
3	SS	1'2"	W	20	10	2" Layer Coarse Sand, Gravel					
4	SS	1'3"	W	40	15						
5	SS	11"	W	65	20	GRAVEL Some Fine to Coarse Sand					
6	SS	1'4"	M	38	25	Gray SILT, Trace Clay, Trace Sand	4.5/				
						End Boring at 25'	4.5				
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____

Upon Completion of Drilling _____

Time After Drilling ½ hour _____

Depth to Water 3'4" _____

Depth to Cave In _____

GENERAL NOTES

Start 6/5/80 Complete 6/5/80

Crew Chief JWG Rig # 55-1

Drilling Method _____

Hollow Stem Auger _____

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B35
 Surface Elevation 584.3
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _u	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
1	SS	X	W	2	5	Black Fine to Medium SAND, Trace to Little Silt and Clay						
2	SS	X	W	11								
3	SS	X	W	16	10	Black Very Fine to Fine SAND, Trace Silt and Clay						
4	SS	X	W	23	15							
5	SS	X	W	32	20	Black Very Fine to Fine SAND, Some to Little Silt and Clay and Clay						
6	SS	X	W	9	25							
7	SS	12"	W	87	30	Black Fine to Coarse SAND, Some Gravel, Some to Little Silt						
8	SS	X	M	33	35	Gray SILT, Some Clay						
						End Boring at 35'						
						Note: Samples 1-6 had a very strong odor, similar to tar						
					40							

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave In _____

GENERAL NOTES

Start 6/6/80 Complete 6/6/80
 St. Dennis
 Crew Chief _____ Rig 750
 Drilling Method _____
 Hollow Stem Auger _____

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ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B36
 Surface Elevation 585.0
 Job No. C 9177
 Sheet 1 of 1

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AMPLE

Moisture
 overy ↓

↓ N Depth

X M 4

SS X W 10 5

SS X W 19 10

SS 11" W 19 15

SS X W 34 20

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

SS 12" M 38 25

VISUAL CLASSIFICATION and Remarks

FILL: Loose Black Coal and Cinders

Tan Fine to Medium SAND, Trace Silt and Clay

Black Very Fine to Medium SAND, Trace Silt and Clay

Black Very Fine to Medium SAND, Some to Little Silt and Clay

End Boring at 25'

* GRAVEL, Some Fine to Coarse Sand

** Gray SILT, Some to Little Sand & Clay, Little to Trace Gravel

Note: Samples 3-5 had a very strong odor, similar to tar

SOIL PROPERTIES

qu W LL PL D

4.5+

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

GENERAL NOTES

Start 6/4/80 Complete 6/4/80
 St. Dennis Rig 750
 Crew Chief St. Dennis
 Drilling Method Hollow Stem Auger

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ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B37
 Surface Elevation 585.2
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				Q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	14"	M	38		FILL: Black COAL with Gravel, Wood, Concrete Tan to Gray Fine to Medium SAND, Trace Silt and Clay					
2	SS	X	W	16	5						
3	SS	X	W	25	10	Black Fine to Medium SAND, Trace Silt & Clay, Trace Fine to Medium Gravel Very Strong Tar Like Odor					
4	SS	X	W	26	15						
5	SS	X	W	28	20						
6	SS	X	W	22	25						
7	SS	15"	M	31	30	GRAVEL, Some Fine to Coarse Sand *					
						End Boring at 30'					
					35	* Black SILT & CLAY, Some to Little Sand Little to Trace Gravel					
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling						Start	6/9/80
Upon Completion of Drilling						Complete	6/9/80
Time After Drilling						Crew Chief	St. Dennis 750
Depth to Water						Drilling Method	
Depth to Cave In						Hollow Stem Auger	

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. B38
 Surface Elevation 585.5
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _v	W	LL	PL	D
No.	Type	↓	↓								
1	SS	X	M	20		FILL: Black Coal, Trace Gravel					
2	SS	X	W	6	5	FILL: Black Very Fine to Medium SAND, Many Large Chunks Concrete, Sand Saturated with Tar Material					
3	SS	X	W	12	10	Black Fine to Medium SAND, Trace Silt and Clay (Note: Sand Saturated with Tar Like Material)					
4	SS	X	W	28	15						
5	SS	X	W	30	20	Black Very Fine SAND, Some Silt and Clay (Saturated with Tar Like Material)					
6	SS	X	W	22	25						
7	SS	6"	W	23							
8	SS	12"	M	89	30	Black Fine to Coarse SAND, Some Gravel *					
						End Boring at 30'					
					35	* Gray SILT, Some to Little Sand & Clay, Little to Trace Gravel					
					40						
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling						Start 6/10/80 Complete 6/10/80					
Upon Completion of Drilling						St. Dennis					
Time After Drilling						Crew Chief Rig 750					
Depth to Water						Drilling Method					
Depth to Cave In						Hollow Stem Auger					

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. 839
 Surface Elevation 584.1
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		Qu	W	LL	PL	D
No.	Type	↓	↓								
						2" FILL: Tan Fine SAND					
1	SS	X	M	12		COAL					
2	SS	X	W	13	5	Brown Fine to Coarse SAND, Some to Little Fine to Coarse Gravel, Trace Silt & Clay					
3	SS	14"	W	23	10	Dark Gray Very Fine to Fine SAND, Trace Silt & Clay					
4	SS	X	W	34	15	Black Very Fine to Fine SAND, Some to Trace Silt & Clay					
5	SS	X	W	34	20						
6	SS	X	W	41	25						
7	SS	X	M	38		* Gray SILT, Some to Little Sand & Clay, Little to Trace Gravel					
					30	End Boring at 29'					
						Note: Sample 4 & 5 had a Strong Odor, Similar to Tar					
					35						
						* GRAVEL, Some Fine to Coarse Sand					
					40						

WATER LEVEL OBSERVATIONS

While Drilling
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 6/9/80 Complete 6/9/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method
 Hollow Stem Auger



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SB-1
Surface Elevation 584.9
Job No. C 9177
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture				Qu	W	LL	PL	D
No.	Type	↓	↓	N						
1	SS	12"	M	12	* Tan to Black Fine to Medium SAND Brown Medium to Coarse SAND, Trace Fine to Coarse Gravel End Boring at 6'					
2	SS	X	M	30						
3	SS	X		22						
					* FILL: Brown & Black Fine to Coarse SAND, Trace Silt & Clay, Trace Fine to Coarse Sand					

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling _____						Start 5/30/80 Complete 5/30/80	
Upon Completion of Drilling _____						St. Dennis	
Time After Drilling _____						Crew Chief _____ Rig 750	
Depth to Water _____						Drilling Method _____	
Depth to Cave In _____						Hollow Stem Auger	



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation.....
 Outboard Marine Corporation.....
 Location Waukegan, Illinois.....

Boring No. SB-2
Surface Elevation 584.9
Job No. C 9177
Sheet 1 of 1

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SB-4
 Surface Elevation 584.2
 Job No. C 9177
 Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE				VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery pc	Moisture %	N	Depth		q _v	W	LL	PL	D
S	8"	M	10	* Dark Gray CINDERS & SAND, Trace Gravel					
SS	11"	W	5	Gray Very Fine to Medium SAND, Trace Silt and Clay, Occasional Fibrous Material					
SS	11.3"	W	28	End Boring at 6'					
			10						
			15	* FILL: Brown SAND & GRAVEL					
			20						
			25						
			30						
			35						
			40						

WATER LEVEL OBSERVATIONS					GENERAL NOTES	
While Drilling					Start	5/30/80 Complete 5/30/80
Upon Completion of Drilling					Crew Chief	JWG, Rig 55-1
Time After Drilling	1/2 hour				Drilling Method	
Depth to Water	1' 2"				Hollow Stem Auger	



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SB-5
Surface Elevation 586.4
Job No. C 9177
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _s	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
1	SS	X	M	7		CINDERS, Trace Silt, Sand and Clay						
2	SS	X	W	2			MARL, Wood Chips & Sand					
3	SS	X	W	10	5	End Boring at 6'						
					10							
					15							
					20							
					25							
					30							
					35							
					40							

WATER LEVEL OBSERVATIONS

While Drilling					
Upon Completion of Drilling					
Time After Drilling	$\frac{1}{2}$ hour				
Depth to Water	2'				
Depth to Cave In					

GENERAL NOTES

Start 6/5/80 Complete 6/5/80
Crew Chief JWG. Rig 55-1
Drilling Method
Hollow Stem Auger



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. MW-1
Surface Elevation 583.5
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery		Moisture		N	Depth		q _s	W	LL	PL	D	
No.	Type	↓	↓									
1	SS	1'4"	M	13	5	Light Gray & Brown Very Fine to Fine SAND, Trace Silt and Clay						
2	SS	8"	W	24								
3	SS	10"	W	34	10	End Boring at 10'						
					15							
					20							
					25							
					30							
					35							
					40							

WATER LEVEL OBSERVATIONS

While Drilling					
Upon Completion of Drilling					
Time After Drilling	$\frac{1}{2}$ hour				
Depth to Water	2' 6" \pm				
Depth to Cave In					

GENERAL NOTES

Start 5/20/80 Complete 5/20/80
Crew Chief JWG Rig 55-1
Drilling Method
Hollow Stem Auger

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. MW-2
Surface Elevation 583.4
Job No. C 9177
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		Depth	q _v		W	LL	PL	D	
No.	Type	↓	↓								N
					See MW-1 for Classification of 0' to 10'						
1	SS	10"	W	30	Gray Very Fine to Fine SAND, Trace Silt & Clay, Trace Gravel, Occasional Coarse Sand Layers						
					End Boring at 15'						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling						Start	5/21/80
Upon Completion of Drilling						Complete	5/21/80
Time After Drilling	1/2 hour					Crew Chief	JWGRig
Depth to Water	2' 6" ±						55-1
Depth to Cave In						Drilling Method	
						Hollow Stem Auger	

ARZYN



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. MW-3
 Surface Elevation 583.4
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE

Recovery Moisture
 Type ↓ N Depth

VISUAL CLASSIFICATION
and Remarks

SOIL PROPERTIES

q_v W LL PL D

See MW-1 & 2 for Classification for
 0' to 15'

Light Gray Very Fine to Fine SAND, Trace
 Silt & Clay, Occasional Gravel Coarse Sand
 Layers

1 SS 11" W 32

2 SS 7" W 21

End Boring at 25'

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Cave In

GENERAL NOTES

Start 5/21/80 Complete 5/21/80
 Crew Chief JWG Rig 55-1
 Drilling Method
 Hollow Stem Auger



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. MW-4
Surface Elevation 583.1
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1	SS	X	M	10	5	Brown & Black Fine to Medium SAND, Trace Organic Material, Some to Little Silt & Clay					
2	SS	X	W	12		Black Very Fine to Fine SAND, Some to Little Silt and Clay					
3	SS	X	W	12	10	End Boring at 10'					
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____ 2' 3"

Upon Completion of Drilling _____

Time After Drilling _____

Depth to Water _____

Depth to Cave In _____

GENERAL NOTES

Start _____ 5/21/80 Complete _____ 5/21/80

St. Dennis _____ Rig _____ 750

Crew Chief _____

Drilling Method _____

Hollow Stem Auger _____

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. MW-5
 Surface Elevation 583.0
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE

Moisture
 very ↓ N Depth

1' 4" W 10

S 1' 2" W 26 5

SS 10" W 29 10

15

20

25

30

35

40

VISUAL CLASSIFICATION and Remarks

Light Gray & Brown Very Fine to Fine
 SAND Trace Silt and Clay

End Boring at 10'

SOIL PROPERTIES

q_v W LL PL D

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling 1.4' _____
 Depth to Water _____

GENERAL NOTES

Start 5/20/88 complete 5/20/88
 Crew Chief JWG Rig 55-1
 Drilling Method _____
 Hollow Stem Auger _____

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ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. MW-6
 Surface Elevation 584.7
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		Qu	W	LL	PL	D
No.	Type	↓	↓								
1	SS	X	M	6	5	Tan Fine to Medium SAND, Little to Trace Silt and Clay, Trace Fine to Medium Gravel					
2	SS	X	W	26							
					10	Streaked Black to Gray Very Fine to Medium SAND, Trace Organic Material, Some to Little Silt and Clay					
3	SS	X	W	36							
					End Boring at 11'						

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave In _____

GENERAL NOTES

Start 5/21/80 Complete 5/21/80
 St. Dennis
 Crew Chief _____ Rig 750
 Drilling Method _____
 Hollow Stem Auger

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation
Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. MW-7
 Surface Elevation 584.5
 Job No. C.9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Type	Recovery ↓	Moisture ↓	N	Depth		q _v	W	LL	PL	D
						3" Asphalt					
1	SS	X	W	14		FILL: Brown Very Fine to Coarse SAND, Trace Silt & Clay, Trace Gravel					
2	SS	11"	W	28	5	Brown Very Fine to Medium SAND, Trace Silt & Clay, Trace Gravel					
3	SS	9"	W	36	10						
						End Boring at 10'					
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling _____
 Upon Completion of Drilling _____
 Time After Drilling ½ hour _____
 Depth to Water 3'6"± _____
 Depth to Cave In _____

GENERAL NOTES

Start 5/23/80 Complete 5/23/80
 Crew Chief JWG Rig 55-1
 Drilling Method _____
 Hollow Stem Auger _____



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LOG OF TEST BORING

Project Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-1
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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Project Subsurface Investigation.....
 Outboard Marine Corporation.....
 Location Waukegan, Illinois.....

Boring No. SC-2
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1/2			W			Black Very Fine to Fine SAND, Some to Little Silt and Clay, Trace Organic Material					
3/4			W								
5/6			W								
7/8			W								
9/10			W								
11			W			5					
						End Boring at 6'					
						Pushed 2" ID Stainless Steel Pipe to take Samples					
							10				
							15				
							20				
							25				
							30				
							35				
							40				

WATER LEVEL OBSERVATIONS

While Drilling.....
 Upon Completion of Drilling.....
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/28/80 Complete 5/28/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-3
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SC-4
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1/2			W			*					
3A/5			W			Black Fine to Medium SAND, Some to Little Silt and Clay, Trace Gravel & Organic Material					
6/7			W								
8/9			W								
10/11			W		5						
12/13			W			Gray Very Fine SAND Some Organic Material					
						End Boring at 6'					
						* Black Very Fine SAND, Some Silt, Some to Little Organic Material					
					10						
							Note 3" Gap 6" to 9"				
							Pushed Stainless Steel 2" ID Pipe to Take Samples				
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 9" Above
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/27/80 Complete 5/27/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method



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LOG OF TEST BORING

Subsurface Investigation
Outboard Marine Corporation
Waukegan, Illinois
Project Location

Boring No. SC-5
Surface Elevation 917.7
Job No. 1
Sheet 1 of 1

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Moisture
Depth
N

VISUAL CLASSIFICATION and Remarks

Black Very Fine SAND, Some Silt and Clay
Some to Little Organic Material
Black and Clay, Trace Gravel & Organic
Silt and Clay, Trace Gravel & Organic
Material
End Boring at 6'
Pushed Stainless Steel 2" ID Pipe to Take Samples

SOIL PROPERTIES

q_u W LL PL D

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Water

18" Above

GENERAL NOTES

Start 5/27/80
Crew Chief St. Dennis
Drilling Method 750

WARZYN**ENGINEERING INC****LOG OF TEST BORING**

Project Subsurface Investigation...
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SC-6
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _u	W	LL	PL	D
No.	Type	↓	↓								
1/2			W			Black Very Fine to Fine SAND, Some Silt & Organic Material					
3/4			W			Gray Fine to Medium SAND, Trace Organic Material, Some Silt and Clay					
5/6			W								
7/8			W								
9/10			W			Gray Fine to Medium SAND, Trace Silt and Clay					
TV12			W		5						
						End Boring at 6'					
					10	Pushed Stainless Steel 2" ID Pipe to Take Samples					
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 8" Above
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/27/80 Complete 5/27/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method

WARZYN



ENGINEERING INC

LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-7
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		Depth	Q _v		W	LL	PL	D	
No.	Type	↓	↓								
1			W			Very Loose Black MUCK, Some Sand					
2/3			W								
4/5			W								
6/7			W								
8/9			W								
10/11			W		5	Dark Gray Very Fine to Medium SAND, Trace Organic Material and Silt and Clay					
						End Boring at 6'					
						Pushed Stainless Steel 2" ID Pipe to Take Samples					

WATER LEVEL OBSERVATIONS

While Drilling 23" Above
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start 5/29/80 Complete 5/29/80
St. Dennis
Crew Chief Rig Tripod
Drilling Method

VARZYN



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LOG OF TEST BORING

Project Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-8
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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SAMPLE				VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery	Moisture	N	Depth		q _s	W	LL	PL	D
Type	↓								
	W			Black Very Fine to Medium SAND, Trace Organic Material, Trace Fine to Coarse Gravel					
	W								
	W								
	W								
	W		5						
	W			End Boring at 6'					
			10	Pushed Stainless Steel 2" ID Pipe to Take Samples					
			15						
			20						
			25						
			30						
			35						
			40						

WATER LEVEL OBSERVATIONS					GENERAL NOTES	
Drilling	5' Above				Start 5/28/80	Complete 5/28/80
Completion of Drilling					St. Dennis	
After Drilling					Crew Chief	Rig Tripod
to Water					Drilling Method	
to Cave In						



LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-10
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-11B
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1/2			W			6" Very Loose Black MUCK					
3/4/5			W			Water with Suspended SAND, Water Black					
6/7			W								
8/9			W								
10/11			W		5	Gray Very Fine to Medium SAND, Little to Trace Silt and Clay					
12/13			W								
						End Boring at 6'					
					10	Pushed Stainless Steel 2" ID Pipe to Take Samples					
						Note: SC-11A was attempted, however sample recovery was unacceptable					
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling 48" Above						Start 5/28/80 Complete 5/28/80	
Upon Completion of Drilling						St. Dennis Rig Tripod	
Time After Drilling						Crew Chief	
Depth to Water						Drilling Method	
Depth to Cave In							

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LOG OF TEST BORING

ProjectSubsurface Investigation.....
Outboard Marine Corporation.....
 LocationWaukegan, Illinois.....

Boring NoSC-12.....
 Surface Elevation
 Job No. C 9177
 Sheet1..... of1.....

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _s	W	LL	PL	D
No.	Type	↓	↓								
1/2			W			*					
3/4			W			3" Layer COBBLES					
5/6			W		5	Gray Very Fine to Medium SAND					
7/8			W								
						End Boring at 6'					
					10	Pushed Stainless Steel 2" ID Pipe to Take Samples					
						2 attempts were made to obtain samples 1st attempt failed due to pushing cobble					
					15						
						* Very Loose Black MUCK, Little to Trace Sand					
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling	30" Above					Start	5/29/80
Upon Completion of Drilling						Complete	5/29/80
Time After Drilling						St. Dennis	
Depth to Water						Crew Chief	Rig Tripod
Depth to Cave In						Drilling Method	

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Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SC-13
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _s	W	LL	PL	D
No.	Type	↓	↓								
1/2			W			Very Loose Black MUCK, Some to Little Sand					
3/4			W								
5/6			W								
7/8			W								
9/10			W								
11/12			W			Black Very Fine to Medium SAND, Little to Trace Silt and Clay, Layers of Water					
						End Boring at 6'					
						Pushed Stainless Steel 2" ID Pipe to Take Samples					
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling 6" Above						Start 5/28/80 Complete 5/28/80					
Upon Completion of Drilling						St. Dennis Rig 750					
Time After Drilling						Drilling Method					
Depth to Water											
Depth to Cave In											



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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-14
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
Recovery			Moisture				q _v	W	LL	PL	D	
No.	Type	↓	↓	N	Depth							
1/2/3			W			Black MUCK, Some to Little Silt, Sand and Clay						
4/5			W									
6/7			W									
8/9						Dark Gray Very Fine to Medium SAND, Trace Silt						
10/11			W		5							
12/13			W									
						End Boring at 6'						
					10		Pushed Stainless Steel 2" ID Pipe to Take Samples					
					15							
					20							
					25							
					30							
					35							
					40							

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling <u>14" Above</u>						Start <u>5/28/80</u> Complete <u>5/28/80</u>	
Upon Completion of Drilling _____						St. <u>Dennis</u>	
Time After Drilling _____						Crew Chief _____ Rig <u>750</u>	
Depth to Water _____						Drilling Method _____	
Depth to Cave In _____						_____	

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LOG OF TEST BORING

Project Subsurface Investigation.....
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SC-15
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
1/2/3			W			Black MUCK, Little to Trace Sand					
4/5			W			Black Very Fine to Medium SAND, Some to					
6/7			W			Little Silt & Clay, Trace Organic Material					
8/9			W								
10/11			W		5	Dark Gray Very Fine to Medium SAND, Trace					
12/13			W			to Little Silt and Clay					
						End Boring at 6'					
					10	Pushed Stainless Steel 2" ID Pipe to Take					
						Samples					
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling 42" Above
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/28/80 Complete 5/28/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method

96



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LOG OF TEST BORING

Project Subsurface Investigation
..... Outboard Marine Corporation
Location Waukegan, Illinois

Boring No. SC-16
Surface Elevation
Job No. C 9177
Sheet 1 of 1

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LOG OF TEST BORING

Project Subsurface Investigation
Outboard Marine Corporation.
Location Waukegan, Illinois

Boring No. SC-17
Surface Elevation
Job No. C 9177
Sheet of

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _v	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
V2/3			W			Very Loose Black MUCK, Little to Trace Sand Dark Gray Very Fine to Medium SAND, Trace Silt and Clay End Boring at 6'					
45/6			W								
7/8/9			W								
10/11			W								
12/13			W								
14/15			W								
						Pushed Stainless Steel 2" ID Pipe to Obtain Sample					
WATER LEVEL OBSERVATIONS						GENERAL NOTES					
While Drilling _____ 14" Above _____						Start <u>5/29/80</u> Complete <u>5/29/80</u>					
Upon Completion of Drilling _____						St. Dennis _____ Rig <u>750</u>					
Time After Drilling _____						Drilling Method _____					
Depth to Water _____											
Depth to Cave In _____											

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LOG OF TEST BORING

Project Subsurface Investigation
 Outboard Marine Corporation
 Location Waukegan, Illinois

Boring No. SC-18
 Surface Elevation
 Job No. C 9177
 Sheet 1 of 1

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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery		Moisture		N	Depth		q _s	W	LL	PL	D
No.	Type	↓	↓								
1/2			W			Very Loose Black MUCK, Trace to Little Sand					
3			W								
4/5/6			W								
7/8			W			Dark Gray Very Fine to Medium SAND, Trace to Little Silt and Clay					
9/10/11			W								
12/13/14			W								
						End Boring at 6'					
						Pushed Stainless Steel 2" ID Pipe to Obtain Samples					
						Note: Sample #1,2 & 3 each about 8" others are 4" to 6"					

WATER LEVEL OBSERVATIONS

While Drilling 13" Above
 Upon Completion of Drilling
 Time After Drilling
 Depth to Water
 Depth to Cave In

GENERAL NOTES

Start 5/28/80 Complete 5/28/80
 St. Dennis
 Crew Chief Rig 750
 Drilling Method

80



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SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q _s	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
2/3				W		Very Loose Black MUCK, Trace Sand					
4/5				W		Water with Suspended SILT & SAND					
6/7				W		Black Very Fine to Medium SAND, Trace to Little Silt and Clay					
8/9				W							
10/11				W							
12/13				W	5	End Boring at 6' Pushed Stainless Steel 2" ID Pipe to Obtain Samples					
					10						
					15						
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS						GENERAL NOTES	
While Drilling 34" Above						Start 5/28/80 Complete 5/28/80	
Upon Completion of Drilling						St. Dennis Rig 750	
Time After Drilling						Drilling Method	
Depth to Water							
Depth to Cave In							

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APPENDIX D

Monitoring Well Construction Details



JOB NO. C 9177

BORING NO. MW-1

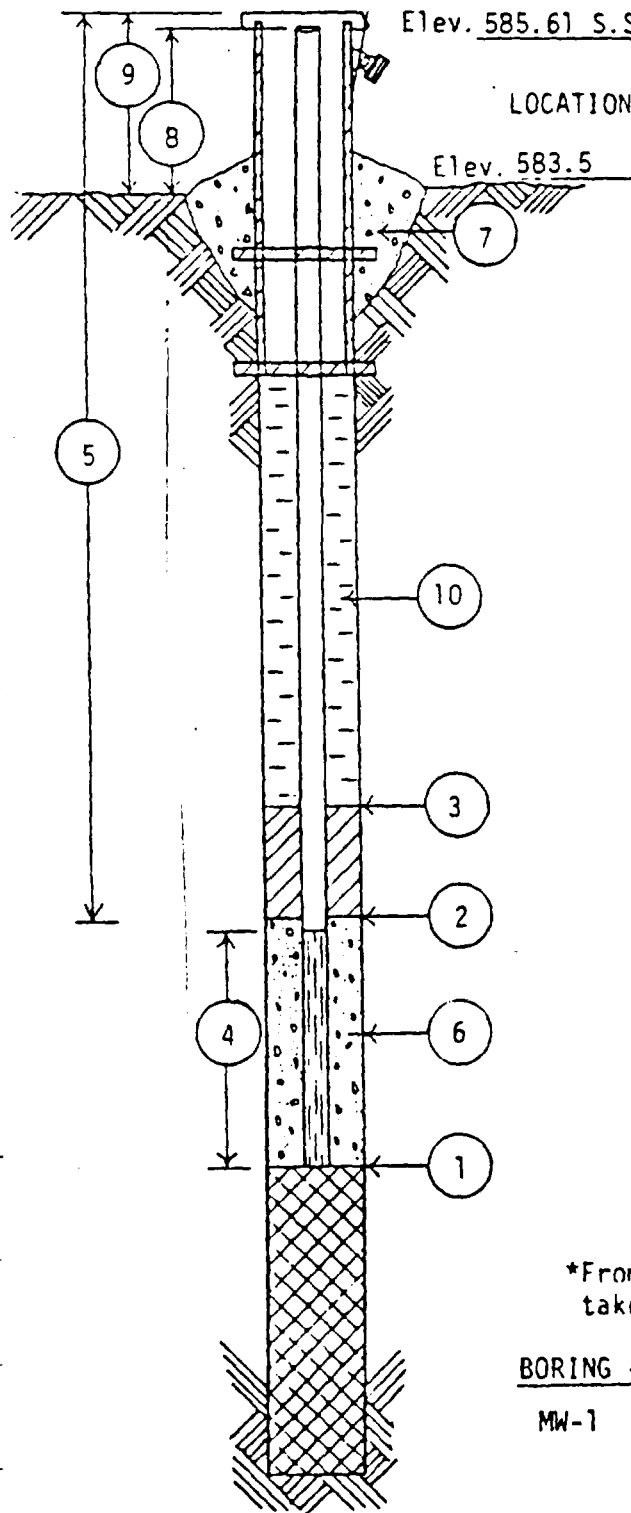
585.78 Protective
Elev. 585.61 S.S.

DATE 5/20/80

CHIEF JWG

LOCATION O.M.C., Wuakegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 9.8 FEET.
- 2 DEPTH OF BOTTOM OF SEAL (if installed) 4.3 FEET.
- 3 DEPTH TO TOP OF SEAL (if installed) 0.0 FEET.
- 4 LENGTH OF WELL POINT, PVC WELL SCREEN, OR SLOTTED PIPE 5 FEET. (Circle One)
- 5 TOTAL LENGTH OF PIPE 12 FEET @ 2 IN. DIAMETER.
- 6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Natural.
- 7 CONCRETE CAP, YES NO (Circle One)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 2.2 FEET.
- 9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 2.3
LOCKING CAP? YES NO (Circle One)
- 10 TYPE OF BACKFILL: Bentonite

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
MW-1	5/20/80	PM	2'6"	from ground

WARZYN
ENGINEERING & CONSTRUCTION, INC.

JOB NO. C 9177

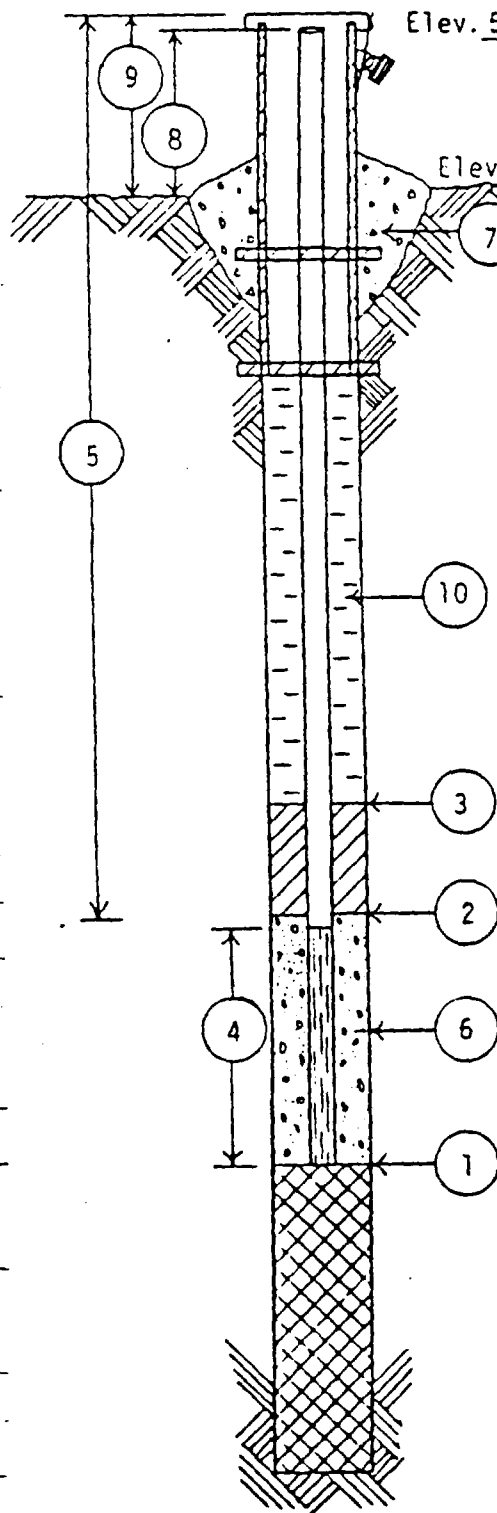
BORING NO. MW-2

586.68 Protective DATE 5/21/80

Elev. 586.52 S.S. CHIEF JWG

LOCATION O.M.C., Wuakegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 15'5" FEET.
- 2 DEPTH OF BOTTOM OF SEAL (if installed) 12 FEET.
- 3 DEPTH TO TOP OF SEAL (if installed) 11 FEET.
- 4 LENGTH OF WELL POINT, PVC WELL SCREEN, OR SLOTTED PIPE 2'6" FEET. (Circle One)
- 5 TOTAL LENGTH OF PIPE 18'6" FEET @ 2 IN. DIAMETER.
- 6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Natural.
- 7 CONCRETE CAP, YES NO (Circle One)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 3'1" FEET.
- 9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 3'2"
LOCKING CAP? YES NO (Circle One)
- 10 TYPE OF BACKFILL: Natural & Bentonite

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
MW-2	5/21/80	AM	2'6"±	from ground

WARZYN
ENGINEERS & SURVEYORS, INC.

JOB NO. C 9177

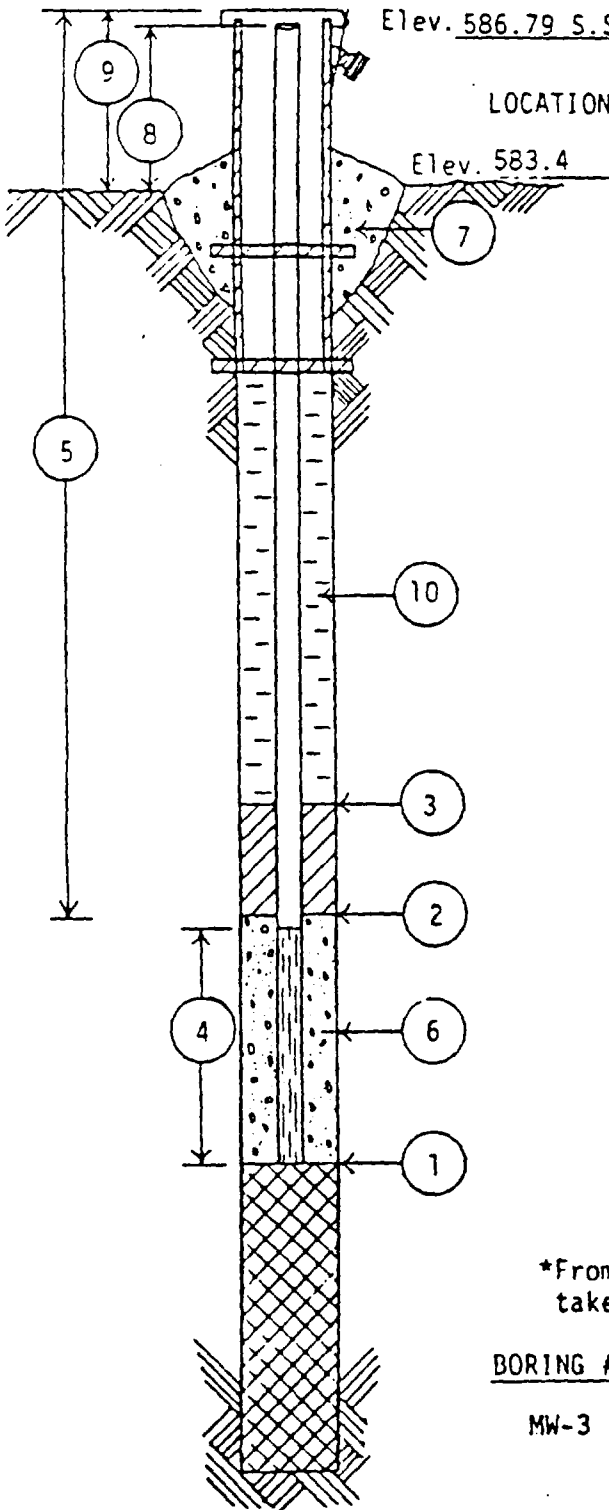
BORING NO. MW-3

586.94 Protective DATE 5/21/80

Elev. 586.79 S.S. CHIEF JWG

LOCATION O.M.C., Wuakegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 27 FEET.
- 2 DEPTH OF BOTTOM OF SEAL (if installed) 24 FEET.
- 3 DEPTH TO TOP OF SEAL (if installed) 23 FEET.
- 4 LENGTH OF WELL POINT PVC WELL SCREEN, OR SLOTTED PIPE 2'6" FEET. (Circle One)
- 5 TOTAL LENGTH OF PIPE 29'6" FEET @ 2 IN. DIAMETER.
- 6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Natural.
- 7 CONCRETE CAP, YES NO (Circle One)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 2'6" FEET.
- 9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 2'7".
LOCKING CAP? YES NO (Circle One)
- 10 TYPE OF BACKFILL: Bentonite

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
MW-3	5/21/80	PM	2'6"±	from ground



WAZYN
WATER & SEWER
CONSTRUCTION, INC.

REMARKS

DEPTH TO WATER

TIME

DATE

BORING #

*From top of casing, if protective casing higher, take measurement from top of protective casing.

WATER LEVEL CHECKS

TYPE OF BACKFILL: Bentonite

PROTECTIVE CASING? ☒ YES ☐ NO (circle one)

LOCKING CAP? ☒ YES ☐ NO (circle one)

HEIGHT OF WELL CASING ABOVE GROUND FEET. 2

CONCRETE CAP, ☒ YES ☐ NO (circle one)

POINT OR SLOTTED PIPE ☒ YES ☐ NO (circle one)

TYPE OF FILTER MATERIAL AROUND WELL @ 2

TOTAL LENGTH OF PIPE IN. DIAMETER. 9'6" FEET

LENGTH OF WELL POINT, PVC WELL SCREEN, FEET. (circle one) 5

DEPTH TO TOP OF SEAL (if installed) FEET. 0

DEPTH OF BOTTOM OF SEAL (if installed) FEET. 2

DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 7'6" FEET

DEPTH TO BOTTOM OF SEAL (if installed) FEET. 2

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

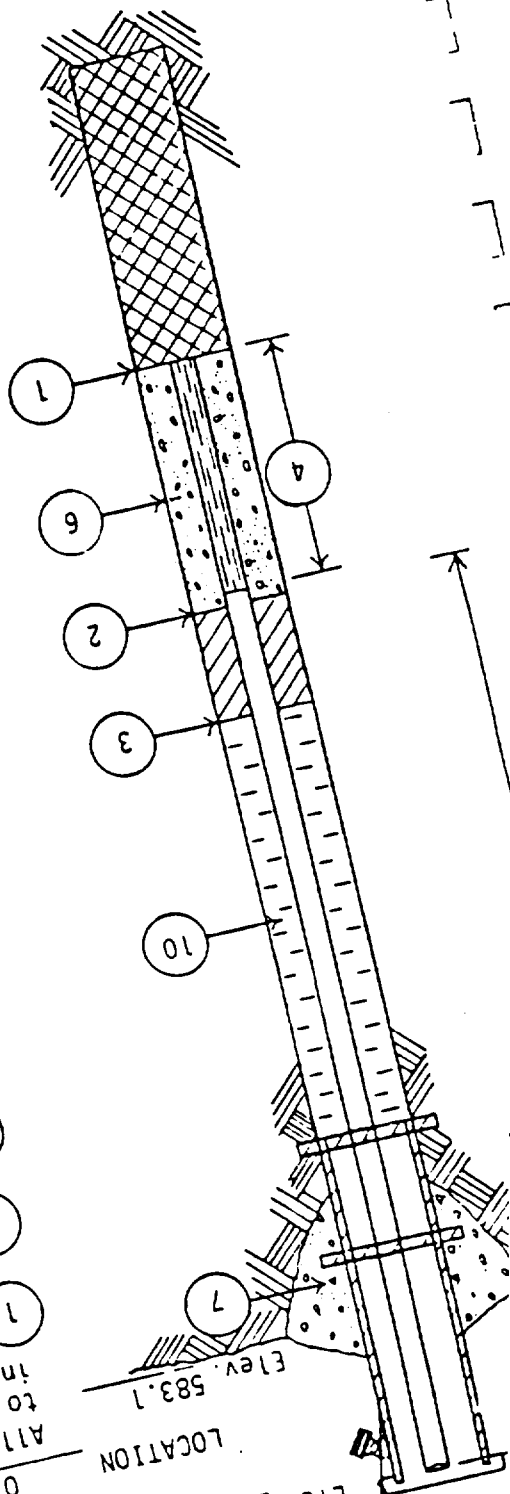
O.M.C. Waukegan, Illinois

CHIEF St. Dennis

JOB NO. MM-4

BORING NO. 9177

DATE 5/21/80



LOCATION

Elev. 585.48 S.S.

585.62 Protective

JOB NO. C 9177

BORING NO. MW-5

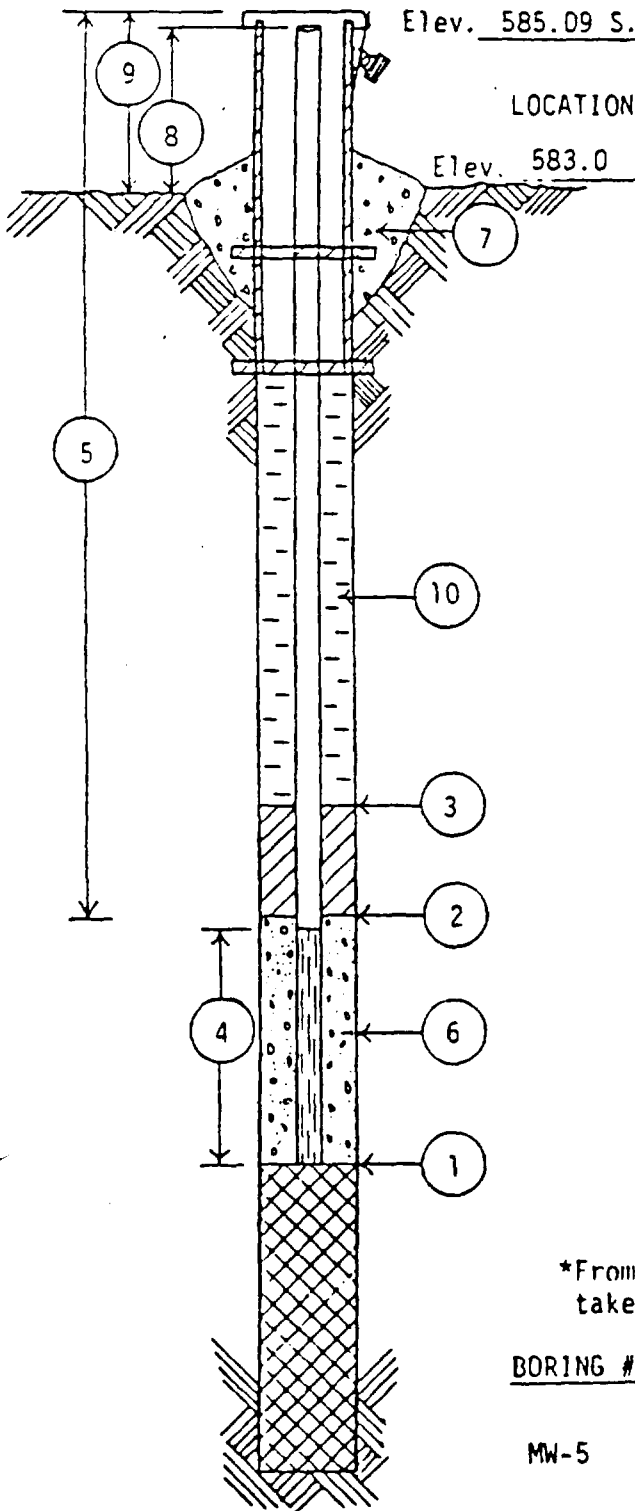
585.27 Protective
Elev. 585.09 S.S.

DATE 5/20/80

CHIEF JWG

LOCATION O.M.C., Waukegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 7 FEET.
- 2 DEPTH OF BOTTOM OF SEAL (if installed) 2 FEET.
- 3 DEPTH TO TOP OF SEAL (if installed) 0 FEET.
- 4 LENGTH OF WELL POINT PVC WELL SCREEN, OR SLOTTED PIPE 5 FEET. (Circle One)
- 5 TOTAL LENGTH OF PIPE 9 FEET @ 2 IN. DIAMETER.
- 6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Natural.
- 7 CONCRETE CAP, YES NO (Circle One)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 2 FEET.
- 9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 2.1.
LOCKING CAP? YES NO (Circle One)
- 10 TYPE OF BACKFILL: Bentonite

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
MW-5	5/20/80	AM	1.4	from ground

WARZYN
A DIVISION OF F. W. M. & S. INC.

2

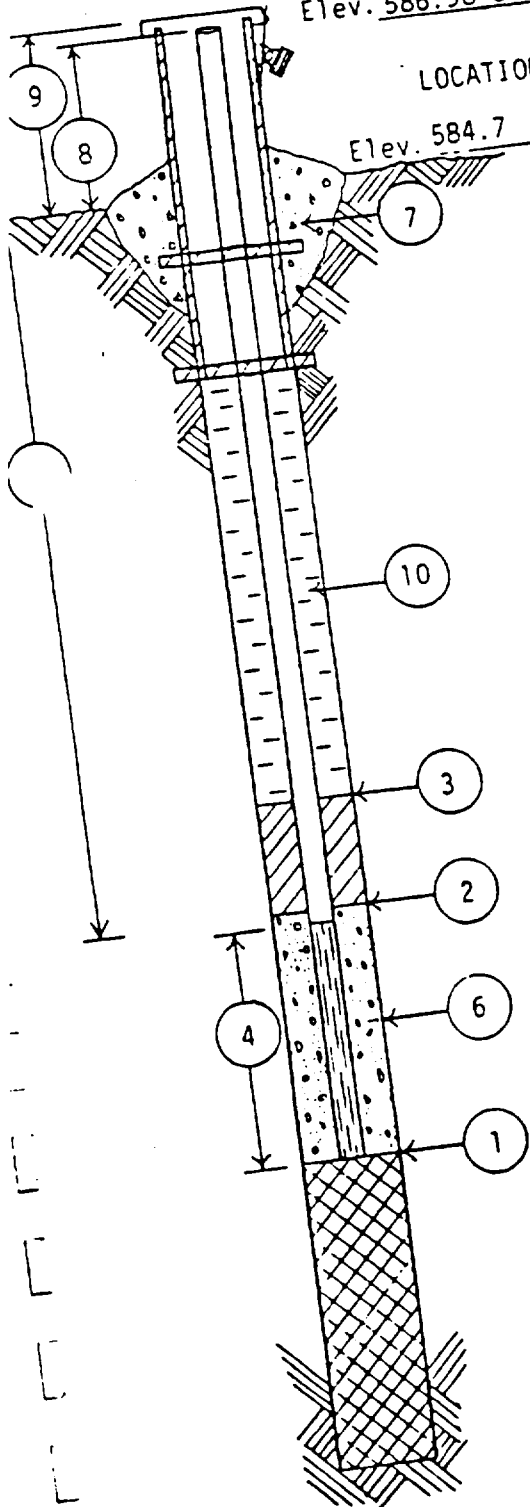
JOB NO. C 9177
BORING NO. MW-6
DATE 5/21/80
CHIEF St. Dennis

587.06 Protective
Elev. 586.98 S.S.

LOCATION

O.M.C., Waukegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 10 FEET.
2 DEPTH OF BOTTOM OF SEAL (if installed) 3 FEET.
3 DEPTH TO TOP OF SEAL (if installed) 0 FEET.
4 LENGTH OF WELL POINT, PVC WELL SCREEN, OR SLOTTED PIPE 5 FEET. (Circle One)
5 TOTAL LENGTH OF PIPE 12'6" FEET @ 2 IN. DIAMETER.
6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint Sand.
7 CONCRETE CAP, YES NO (Circle One)
8 HEIGHT OF WELL CASING ABOVE GROUND 2'6" FEET.
9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 2'7".
LOCKING CAP? YES NO (Circle One)
10 TYPE OF BACKFILL: Sand & Bentonite Mix

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN
BORING & PUMPING INC.

JOB NO. C 9177BORING NO. MW-7587.65 Protective Elev. DATE 5/23/80CHIEF JWGLOCATION O.M.C., Waukegan, Illinois

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 9'6" FEET.
- 2 DEPTH OF BOTTOM OF SEAL (if installed) 3 FEET.
- 3 DEPTH TO TOP OF SEAL (if installed) 0 FEET.
- 4 LENGTH OF WELL POINT, PVC WELL SCREEN, OR SLOTTED PIPE 5 FEET. (Circle One)
- 5 TOTAL LENGTH OF PIPE 12'6" FEET @ 2 IN. DIAMETER.
- 6 TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Natural.
- 7 CONCRETE CAP, YES NO (Circle One)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 3 FEET.
- 9 PROTECTIVE CASING? YES NO (Circle One)
HEIGHT ABOVE GROUND 3.7.
- LOCKING CAP? YES NO (Circle One)
- 10 TYPE OF BACKFILL: Bentonite

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
MW-7	5/23/80	AM	3'6"±	from ground

WARZYN
ENGINEERING & SURVEYING, INC.

APPENDIX E

Baildown Test Results



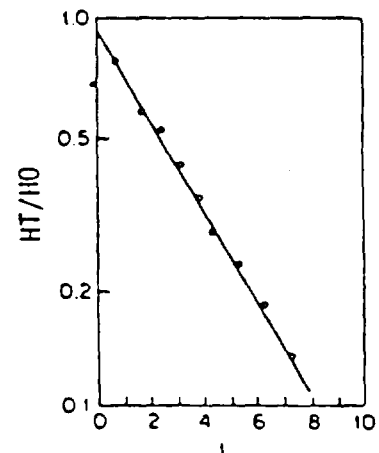
BAILDOWN PERMEABILITY TEST GENERAL PROCEDURES

The purpose of a baildown test is to measure the in-situ permeability of subsurface materials. Baildown tests measure the water bearing properties of undisturbed, in-place aquifer material whereas laboratory tests require removal of material from its natural environment. During the collection of samples for laboratory testing, the material is disturbed and a laboratory permeability test may not be representative of actual in-field permeability.

The general procedure for a baildown test is to instantaneously remove water from a well by bailing or pumping and measure the rate at which the water in the well returns to its static level. The rate of water level rise and the physical dimensions of the well (screen length and diameter) are directly related to the permeability of the aquifer material. The greater the permeability, the faster the water in the well will return to the static, pre-test level.

DATA REDUCTION

The method of interpreting the water level vs. time data that arise from a baildown test is that of Hvorslev (1951)¹, also in NAVFAC (1971)². A plot of field recovery data shows an exponential decline of recovery rate with time. If the recovery is normalized to HT_n (Figure b) and ratios of unrecovered head differences are plotted on a logarithmic scale, a straight line plot results (Figure a). Faster recovery rates are expressed as steeper slopes, implying higher permeability values.

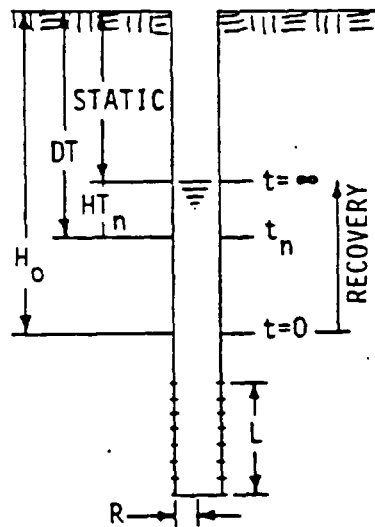


(a)

Warzyn Engineering has developed a computer method to efficiently reduce and analyze baildown test field data. Input field data is converted to values which can be used for graphical analysis. A statistical evaluation estimates the fit of data to a theoretical curve.

With a screen shape $L/R > 8$, the expression for permeability K is:

$$K = \frac{R^2}{2L(t_2 - t_1)} \ln \left(\frac{L}{R} \right) \ln \left(\frac{HT_2}{HT_1} \right)$$



(b)

Where: R = Radius of well screen
 L = Length of well screen
 HT_n = Unrecovered head difference at time t_n
 STATIC = Measured depth to stabilized water level
 DT = Input data (measured depth to water at time t_n)

Time, input as hours, minutes and seconds, is converted to seconds of elapsed time. Measured depth to water at time t_n (DT) is converted to a ratio of head differences (HT/H_0), or percent drawdown. These values can be plotted on semi-cycle log paper with time on the abscissa.

.....
 BAILDOWN PERMEABILITY TEST RESULTS
 WELL #: 9 9999
 1/ 17/ 80

C- 9999

STATIC: 50.00

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	0: 1: 0	80.00	30.00	0	1.00E+00	0.000
2	0: 2: 0	76.00	26.00	60	8.67E-01	-0.143
3	0: 3: 15	74.00	24.00	135	8.00E-01	-0.223
4	0: 5: 0	72.00	22.00	240	7.33E-01	-0.310
5	0: 7: 3	68.00	18.00	360	6.00E-01	-0.511
6	0: 10: 21	64.00	14.00	561	4.67E-01	-0.762
7	0: 15: 0	60.00	10.00	840	3.33E-01	-1.099
8	0: 25: 10	56.00	6.00	1450	2.00E-01	-1.609
9	0: 45: 30	52.00	2.00	2670	6.67E-02	-2.708
10	1: 2: 35	50.10	0.10	3695	3.33E-03	-5.704

CORRELATION COEFFICIENT = -0.974
 SLOPE = 1.1 E-03

FOR- RADIUS: 2.540 CM = 1.000 IN.
 SCREEN: 30.480 CM = 1.000 FT.

BEST FIT:
 PERMEABILITY = 3.58E-04 CM/SEC

STATISTICAL EVALUATION

FOR- RADIUS: 2.540 CM = 1.000 IN.
 SCREEN: 30.480 CM = 1.000 FT.
 T1-H1: 0 1.00E+00
 T2-H2: 3695 3.33E-03

SELECTED POINTS

PERMEABILITY = 4.06E-04 CM/SEC

INTERVAL EVALUATION

.....

Time (Sec) = Lapsed time in seconds
 HT/H0 = Unrecovered head difference at time tn
 Initial unrecovered head difference

If the statistical correlation is good, the slope of the best fit, or least scatter, curve can be used to calculate a permeability value. The correlation coefficient ranges from 0 to -1. A correlation coefficient of -1 indicates a perfect correlation, or no scatter of points around the best fit curve.

Permeability may be evaluated also for various intervals of the recovery data by inputting parametric values of any two selected points. The slope of the line between these points is used to calculate a permeability value.

¹ Hvorslev, M.J. 1951, Time Lag and Soil Permeability in Groundwater Observations. U.S. Army Corps Engineers. Waterways Exp. Sta. Bull 36, Vicksburg, Miss.

² United States Department of the Navy
Design Manual: Soil Mechanics, Foundations, and Earth Structures
NAVFAC DM-F, March 1971, page 7-4-9.

BUILDUP PERMEABILITY TEST RESULTS

WELL #: MM 1

C-9177

READING

1 12: 17: 32
2 12: 17: 41
3 12: 18: 10

STATIC: 3.45

DT
4.00
3.60
3.50

HT
0.55
0.15
0.05

TIME(SEC) HT/H0 LN(HT/H0)
0 1.00E+00 0.000
15 2.73E-01 -1.299
40 9.09E-02 -2.398

CORRELATION SLOPE
-0.982
-5.60E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
SCREEN: 152.400 CM = 5.000 FT.

BEST FIT:
PERMEABILITY = 4.86E-03 CM/SEC

BUILDUP PERMEABILITY TEST RESULTS

WELL #: MM 2

C-9177

READING

1 12: 56: 39
2 12: 57: 52
3 12: 58: 30
4 12: 58: 45

STATIC: 4.24

DT
8.00
6.00
4.90
4.60

HT
3.76
1.76
0.66
0.36

TIME(SEC) HT/H0 LN(HT/H0)
0 1.00E+00 0.000
85 4.68E-01 -0.759
120 1.75E-01 -1.740
135 9.57E-02 -2.346

CORRELATION SLOPE
-0.946
-1.60E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
SCREEN: 60.560 CM = 2.000 FT.

BEST FIT:
PERMEABILITY = 2.68E-03 CM/SEC

.....
 BAILDOWN PERMEABILITY TEST RESULTS

C- 9177

WELL #: MW 3
 6/ 9/ 80

STATIC: 4.92

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	1: 28: 15	14.00	9.08	0	1.00E+00	0.000
2	1: 29: 0	10.00	5.08	50	5.59E-01	-0.581
3	1: 29: 32	9.00	4.08	75	4.49E-01	-0.800
4	1: 30: 7	8.00	3.08	110	3.39E-01	-1.081
5	1: 30: 40	7.00	2.08	145	2.29E-01	-1.474
6	1: 31: 45	6.00	1.08	210	1.19E-01	-2.129
7	1: 32: 30	5.50	0.58	255	6.39E-02	-2.751
8	1: 34: 10	5.00	0.08	355	8.81E-03	-4.732

CORRELATION -0.985
 SLOPE -1.25E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
 SCREEN: 60.960 CM = 2.000 FT.

BEST FIT:
 PERMEABILITY = 3.11E-03 CM/SEC

.....
 BAILDOWN PERMEABILITY TEST RESULTS

C- 9177

WELL #: MW 4
 6/ 6/ 80

STATIC: 3.16

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	8: 56: 30	3.80	0.64	0	1.00E+00	0.000
2	8: 56: 45	3.50	0.34	15	5.31E-01	-0.633
3	8: 57: 25	3.30	0.14	55	2.19E-01	-1.520
4	8: 59: 5	3.16	0.00	155	1.56E-03	-6.461

CORRELATION -0.991
 SLOPE -4.07E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
 SCREEN: 152.400 CM = 5.000 FT.

BEST FIT:
 PERMEABILITY = 3.53E-03 CM/SEC

BAILDOWN PERMEABILITY TEST RESULTS

WELL #: MW 5
6/ 6/ 80

C- 9177

STATIC: 2.21

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	8: 17: 10	3.00	0.79	0	1.00E+00	0.000
2	8: 17: 15	2.50	0.29	5	3.67E-01	-1.000
3	8: 19: 10	2.30	0.09	120	1.14E-01	-2.172

CORRELATION -0.904
SLOPE -1.44E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
SCREEN: 152.400 CM = 5.000 FT.

BEST FIT:
PERMEABILITY = 1.25E-03 CM/SEC

BAILDOWN PERMEABILITY TEST RESULTS

WELL #: MW 6
5/ 30/ 80

C- 9177

STATIC: 5.03

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	1: 50: 0	5.50	0.47	0	1.00E+00	0.000
2	1: 50: 45	5.15	0.12	45	2.55E-01	-1.365
3	1: 52: 15	5.11	0.08	135	1.70E-01	-1.771

CORRELATION -0.881
SLOPE -1.18E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
SCREEN: 152.400 CM = 5.000 FT.

BEST FIT:
PERMEABILITY = 1.02E-03 CM/SEC

SHUT-DOWN PERMEABILITY TEST RESULTS

WELL #: MM

6/ 3/ 80

0-9177

STATIC: 5.08

READING	CLOCK TIME	DT	HT	TIME(SEC)	HT/H0	LN(HT/H0)
1	4: 39: 15	6.00	0.93	0	1.00E+00	0.000
2	4: 39: 30	5.50	0.43	15	4.57E-01	-0.784
3	4: 40: 00	5.30	0.23	75	2.39E-01	-1.431
4	4: 42: 30	5.20	0.12	160	1.30E-01	-2.037

CORRELATION SLOPE -0.936
-1.07E-02

FOR- RADIUS: 2.540 CM = 1.000 IN.
SCREEN: 152.400 CM = 5.000 FT.

BEST FIT:
PERMEABILITY = 9.27E-04 CM-SEC

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APPENDIX F

Chain of Custody Procedures



APPENDIX F

CHAIN OF CUSTODY PROCEDURES

A pre-drilling briefing was held among drilling personnel and the field coordinator from Warzyn Engineering Inc., to inform all personnel of project objectives, sample locations and Chain of Custody procedures. Brief meetings were also periodically held during and after all Chain of Custody samples were collected to discuss procedures.

The drill crew chief collected all soil samples. Each sample was placed in a 32 ounce wide-mouth jar, aluminum foil was placed over the mouth of the jar before the lid was put on the jar. When a box of sample jars (12) was collected, the box had a numbered seal placed over it. Over the numbered seal, tamper-proof evidence tape was placed to allow detection if the boxes were opened.

All jars were labeled at the time of collection, the labels indicated at a minimum: boring number, sample number, sample depth, and date. The numbered seals were used to correlate boxes of samples with Chain of Custody forms. Each Chain of Custody form contained a manifest of the samples contained within each numbered box. A Chain of Custody form is attached. All boxes and/or individual samples were maintained in conditions consistent with strict Chain of Custody. The person having custody of the sample, at all times, either maintained physical possession of the sample, kept the sample in view after being in his or her physical possession, or the samples were placed in a suitably locked and secure location.

Periodically the drilling crew chiefs transferred custody of the samples to the field custodian. When transferring possession of samples, the transferee and the receiver signed and dated the Chain of Custody form.

Weekly the samples were transported to Ral-Tech Scientific Services of Madison, Wisconsin, by the field custodian. These samples were transferred via private vehicle, with strict custody procedures being followed. Immediately upon arrival in Madison, the field custodian signed the samples over to a representative of Ral-Tech.

The above procedure was also followed on all samples preserved for volatile organics by freezing immediately after collection.



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
Surveillance and Analysis Division
536 South Clark St.
Chicago, Illinois 60605

CHAIN OF CUSTODY RECORD

CUSTODY SIGNATURES

The persons whose signatures are listed below certify that the collected samples listed in the sample inventory and master packing list above had the samples in their custody and the only manner in which custody was given up was either to one of the other persons listed below or to a locked and/or secured area or chest.

(CONTINUED FROM THE OBVERSE SIDE)

COURIER
AND/OR
COMMERCIAL
CARRIER

_____	_____	_____
Signature or Carrier	Sent To	Date and Time (Signed or Dispatched)

HWIS
CUSTODIAN

_____	_____
Signature	Date and Time

COURIER
AND/OR
COMMERCIAL
CARRIER

_____	_____	_____
Signature of Carrier	Sent To	Date and Time (Signed or Dispatched)

CRL LAB
CUSTODIAN

_____	_____
Signature	Date and Time

CRL
SECTION
CHIEF

_____	_____
Signature	Date and Time

APPENDIX G

Boring and Monitoring Well Location and Elevations

OMC PLANT
WAUKEGAN, ILLINOIS
Boring and Well Elevations and Locations
C-9177

Boring or Well No.	Top of Stainless Steel Casing	Top of Protective Metal Casing	Ground Elevation	Baseline Station	Distance Right	Distance Left
MW 1	585.61	585.78	583.5	30+21	40	
MW 2	586.52	586.68	583.4	30+21	40	
MW 3	586.79	586.94	583.4	30+21	40	
MW 4	585.48	585.62	583.1	30+80		120
MW 5	585.09	585.27	583.0	20+50	240	
MW 6	586.98	587.06	584.7	28+99	380	
MW 7		587.65	584.55	20+80	130	
SB 1			584.9	14+60	137	
SB 2			584.9	14+20	136	
SB 3			584.4	6+77	401	
SB 4			584.2	6+21	666	
SB 5			586.4	0+92	261	

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OMC PLANT
WAUKEGAN, ILLINOIS
Boring and Well Elevations and Locations
C 9177

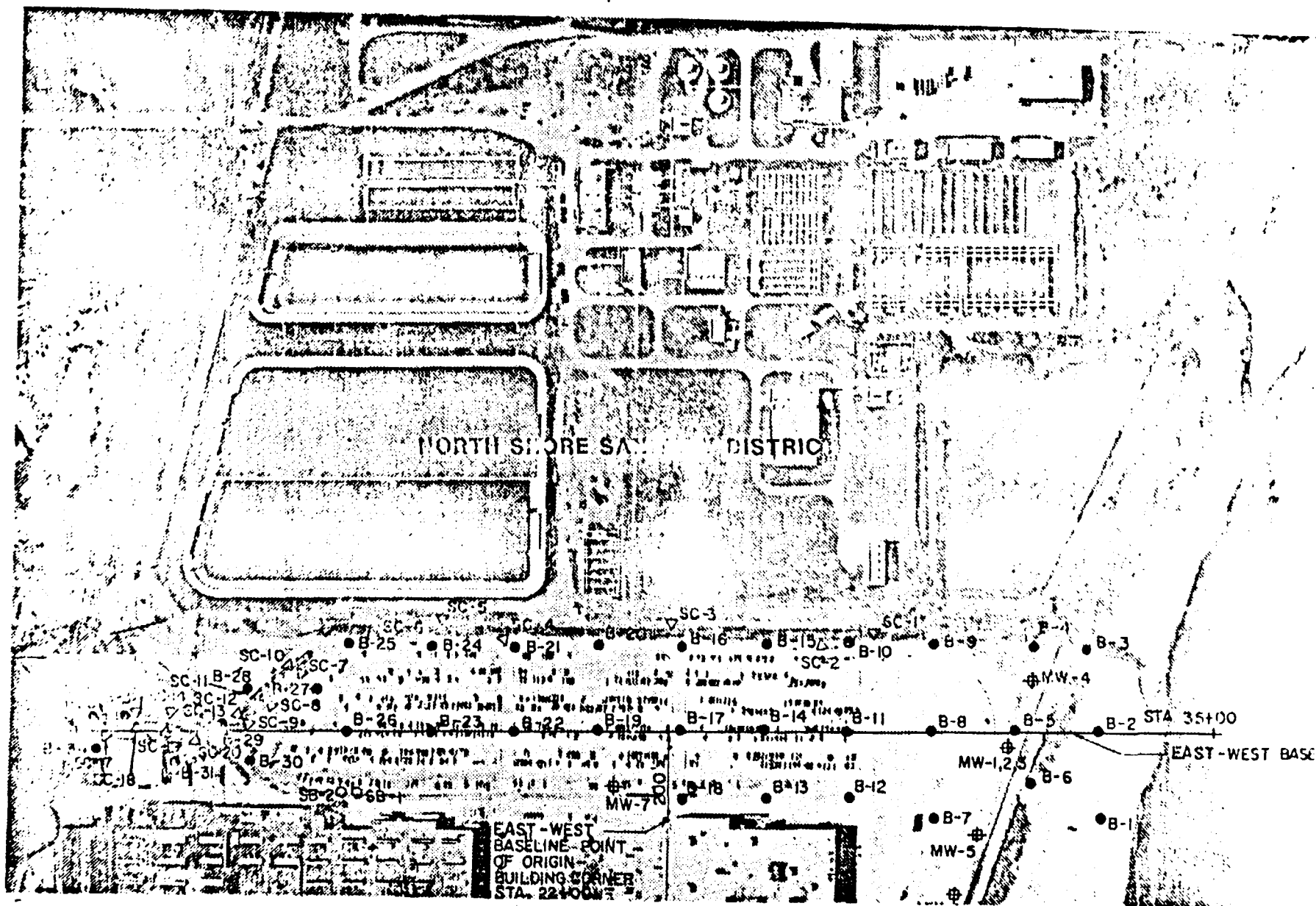
Boring or Well No.	Top of Stainless Steel Casing	Top of Protective Metal Casing	Ground Elevation	Baseline Station	Distance Right	Distance Left
B-1				32+40	200	
B-2				32+40	0	0
B-3			583.2	32+10		195
B-4			582.8	30+80		200
B-5			583.1	30+40	0	0
B-6			584.9	30+74	119	
B-7			584.5	28+40	200	
B-8			585.3	28+40	0	0
B-9			584.2	28+40		205
B-10			583.8	26+34		200
B-11			585.4	26+40	0	0
B-12			585.2	26+40	152	
B-13			585.2	24+39	153	
B-14			584.9	24+40	0	0
B-15			583.8	24+44		206
B-16			583.9	22+40		200

OMC PLANT
WAUKEGAN, ILLINOIS
Boring and Well Elevations and Locations
C 9177

Boring or Well No.	Top of Stainless Steel Casing	Top of Protective Metal Casing	Ground Elevation	Baseline Station	Distance Right	Distance Left
B-17			584.6	22+40	0	0
B-18			584.7	22+41	158	
B-19			584.4	20+40	0	0
B-20			583.9	20+40		200
B-21			583.8	18+40		200
B-22			584.4	18+40	0	0
B-23			584.4	16+40	0	0
B-24			583.9	16+40		202
B-25			583.7	14+40		209
B-26			584.4	14+40	0	0
B-27			584.1	13+40		100
B-28			585.2	12+02		104
B-29			584.8	11+38		20
B-30			585.1	12+05	66	
B-31			584.5	10+30	69	
B-32			584.6 (9+09		45

[illegible]

* Means N-S Baseline



OUTBOARD MARINE CORPORATION

NORTH-SOUTH
BASELINE - POINT
OF ORIGIN -
BUILDING CORNER
STATION 0+00

SEAHORSE DRIVE

WAWKEGAN HARBOR

B-35

B-36

B-39

NORTH-SOUTH BASELINE

WAWKEGAN HARBOR

○ SB-3 4' ALLOW BORING - 6' DEEP
 △ SC-10 SEDIMENT CORES



NO	BY	DATE	REVISION	APP'D
BORING AND MONITORING WELL LOCATION MAP				
OUTBOARD MARINE CORPORATION WAUKEGAN ILLINOIS PREPARED FOR MASON AND HANGER - SILAS MASON COMPANY EDISON, NEW JERSEY				
WARZYN ENGINEERING INC		DRAWN CMP CHECKED JAH APPROVED <i>[Signature]</i> REFERENCE	SCALE 1" = 200' DATE 7/28/80	SHEET 1 OF 1 DRAWING NO C9177-1 PRINTED OCT 17 1980



NOTES

1. AERIAL PHOTO OBTAINED FROM JRB. ASSOCIATES, MCLEAN, VIRGINIA.

2. BORINGS SURVEYED BY WARZYN ENGINEERING INC., JUNE 1980.

REFER TO APPENDIX 'G' OF TEXT FOR EXACT COORDINATE LOCATIONS

OF BORINGS AND WELLS.

3. SHALLOW BORING SB-5 IS BEYOND THE AREA SHOWN BY THIS AERIAL PHOTO.

4. AREA SHOWN ON THIS PHOTO INCLUDES PORTIONS OF SECTIONS 15 AND 22,

T45N, R23E, LAKE COUNTY, ILLINOIS.

5. SCALE IS APPROXIMATE.

LEGEND

MW-7 GROUNDWATER OBSERVATION WELL & NUMBER